A CHILTON PUBLICATION

# the Iron Age

THE NATIONAL METALWORKING WEEKLY

March 19, 1953

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UNIV. OF MICHIGAN
MAR 20 1953
EAST ENGINEERING
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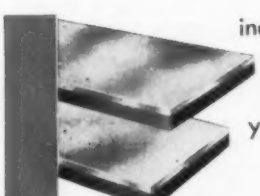
on the GO at Claymont

Yes, we're really rolling ahead in high gear here at Claymont. Newly installed equipment, including Vertical Edger, Hot Shears, Slabbing Furnace and Annealing Furnace, will enable us to give you faster delivery through stepped-up production.

Flanged and Dished Heads



Stainless-Clad Steel Plates

Alloy and Carbon Steel Plates

Large Diameter Welded Steel Pipe

CLAYMONT STEEL PRODUCTS
PRODUCTS OF WICKWIRE SPENCER STEEL DIVISION
THE COLORADO FUEL AND IRON CORPORATION
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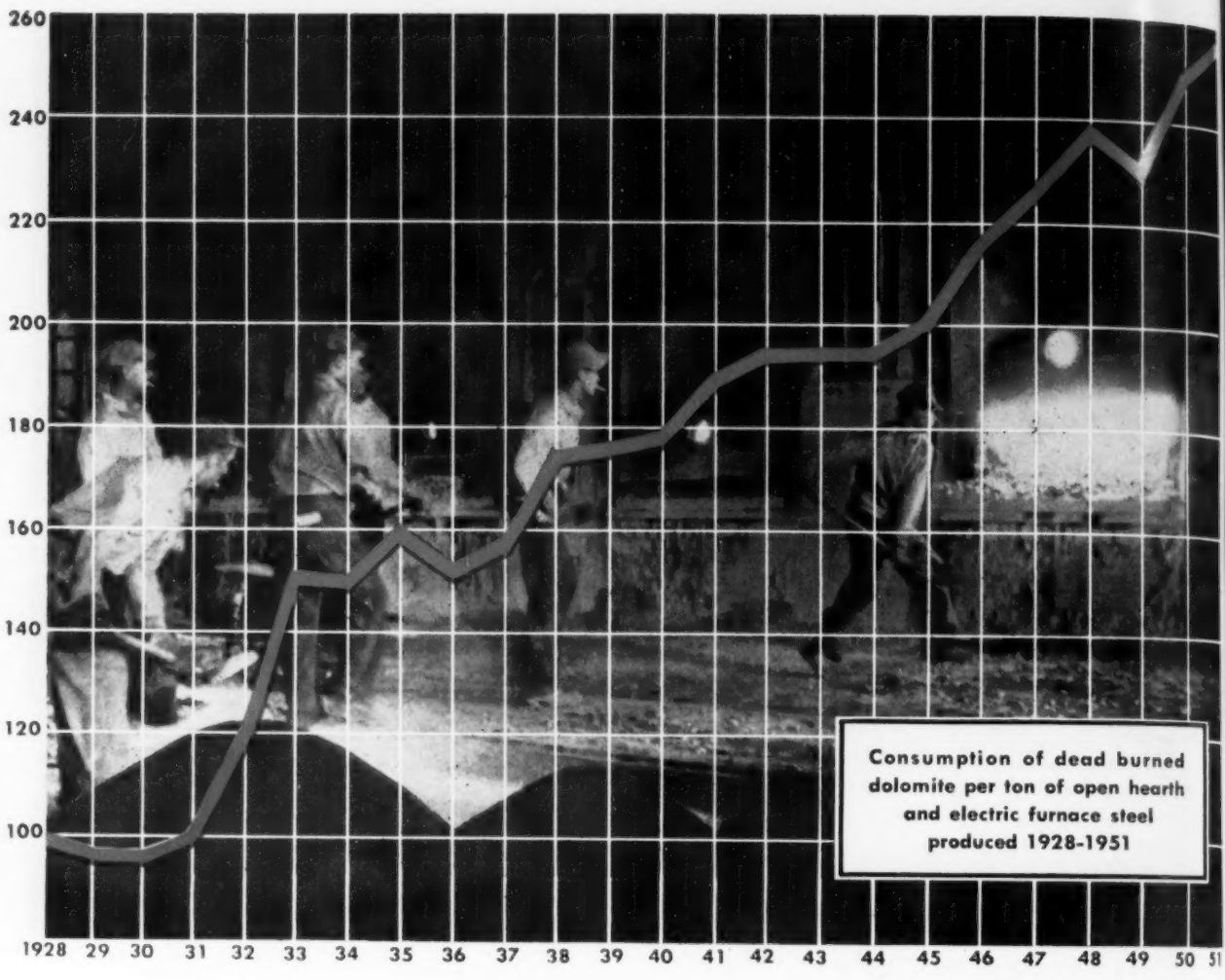


# just what is dead burned dolomite?

IT is a hearth maintenance refractory made from a relatively inexpensive raw material (dolomite). Under properly controlled manufacturing processes, dead burned dolomite develops certain inherent qualities advantageous to efficient, low cost maintenance—qualities which have led to a steadily widening acceptance by the steel industry.

Typically, dolomite suitable for dead burning shows a chemical analysis of lime 30.4%, magnesia 21.6%, silica 0.3%, other oxides 0.2% and carbon dioxide 47.5%. Prior to dead burning, quarried dolomite is classified to proper sizes and the very fine particles, along with clay and silt, are removed by washing.

The sized, washed dolomite granules, proportioned with a small percentage of iron oxide, travel through rotary kilns heated to above 3000°F. As they pass through the hot gases, the particles are first calcined, giving up approximately half their weight of carbon dioxide, and then sintered and shrunk to dense, hard clinkers. High temperature reactions convert calcium oxide to crystalline lime and magnesium oxide to periclase. Some lime also combines with iron oxide and silica to serve the refractory as a bonding agent.

The resultant product has been variously called "double burned", "roasted", "sintered", "clinkered", "prepared", "black" and "dead burned" dolomite. Of these designations, dead burned is now the generally accepted term, indicating as it does the characteristic hard, dense, inert, crystalline, highly refractory quality of the material.

Dependable dead burned dolomite, marketed under the well-known trade names Magnefer and Syndolag, is manufactured by Basic Refractories at its Ohio Works—recently expanded to meet the industry's ever increasing use of this refractory.

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ABC Audited Paid Circulation

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CCA Controlled Circulation Audit

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# There'll Be Changes

THE stockholders knew that the XYZ Co. had become run down at the heels. Morale was bad. Some felt the company could be put in much better shape—but they were in the minority.

Things got so bad that the company's future was threatened. Realizing this the stockholders finally were successful in bringing to the company a new president.

The new executive officer was a man of proven ability and integrity. He believed in delegation of authority. He knew he could not do everything himself—he had to depend on others for hard work and loyalty.

He believed in drastic but fair action in remaking company policy and striving for top level performance. Fired by this challenge he was ready to "clean house" of drones and malcontents. He would promote those who were for hard work, new ideas and cooperation.

Things went well at first. Weak points were turned up. Plans were made to boost morale, sales and output. Employees and management were interviewed for new ideas. Soon the new executive officer knew that he would have to fire some, transfer others and depend heavily on a few.

But there was a fly in the ointment. Under company rules he found he wasn't allowed to get rid of the drones, transfer those who would do better elsewhere. And he found few upon whom he could lean.

The new president had two choices: (1) He could let things go as best they could, counting on changes; or (2) he could keep a tight rein on things and do everything himself. If he took the first choice there was a chance things would not get better. If he took the second course he might not live long enough to do a good job.

That was pretty much the position of the new Administration and its cabinet officers up to a week ago. Some holdovers don't see things the way new department heads want them. Others don't care. Still others have lost heart. But changes in Civil Service rules will make a big difference.

When you feel that things ought to move a little faster down in Washington remember the XYZ Co. Have patience until the new fellows perform a few miracles and do a little reshuffling. That's why President Eisenhower appointed them to their jobs.

Tom Campbell

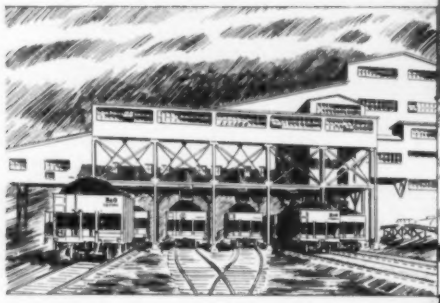
*Editor*

# Are you keeping FUEL COSTS as low as you can?

## ASK OUR MAN!

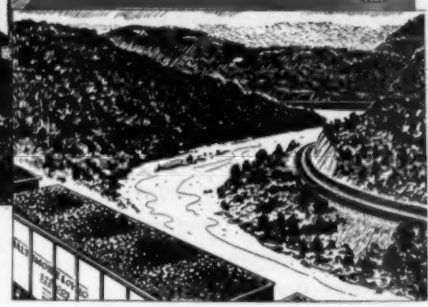
He will demonstrate with *facts* why your best bet is bituminous coal. He will help you find the right kind and size of coal for your specific need; and he will show you up-to-the-minute ways of burning it efficiently and economically.

In Baltimore & Ohio territory, close to industry's doorstep, are bituminous coals in all varieties—for power, coking, steam, heating. Produced in highly mechanized mines, these coals are low in cost and uniform in size and quality. With the modern burning equipment now available, the efficiency and cleanliness of bituminous coal will amaze you!

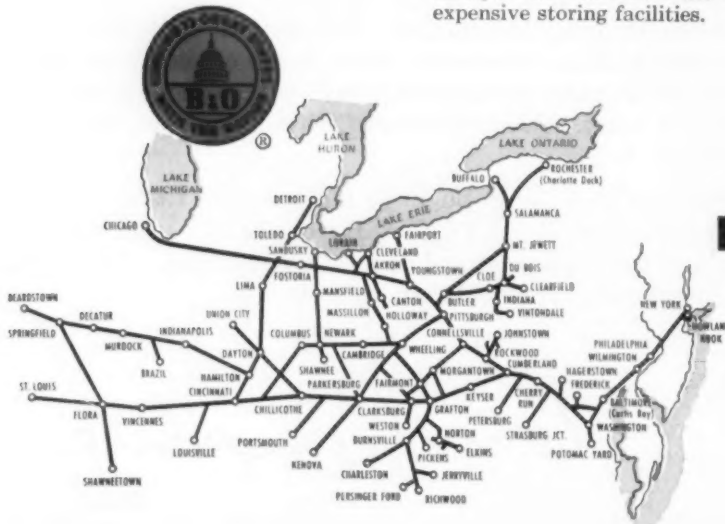


**Surprising economy.** Conveniently accessible and highly efficient in modern use, bituminous coal from mines on the B&O keeps fuel costs low.

**Convenient storage.** Bituminous coal can be stored anywhere with safety. This eliminates the need for expensive storing facilities.



**Reserves for centuries.** Plants built for bituminous coal are assured a continuity of fuel supply regardless of emergencies. On the B&O alone, are reserves estimated at 25 billion tons!




# Baltimore & Ohio Railroad

***Bituminous Coals for Every Purpose***

# Dear Editor:

*Letters from readers*

### Vice-President of Souls

Sir:

I enjoyed your editorial of Mar. 5 entitled "Vice-President in Charge of Souls." One advantage of managing a small company is that you can look under the skin and learn what is corrupting the meat. There is more satisfaction in helping your employees be healthy and happy than there is in gaining power and wealth.

By the way, since you are concerned with souls, do you remember the Lord's instruction to Moses when he told him to appoint judges and magistrates? Deuteronomy, third chapter, nineteenth verse: "Thou shall not accept person nor gifts, for gifts blind the eyes of the wise and change the words of the just." In other words, graft and high pressure entertaining are one and the same.

*R. L. GIEBEL*
*President*

*Giebel, Inc.*
*New York*

### Useful Statistics

Sir:

If a copy of your "Annual Review and Metal Industry Facts" issue of Jan. 1, 1953 is available I would appreciate receiving a copy.

I have found the information as compiled and presented in this annual review very helpful to me in my work in the Office of Production of the Office of Defense Mobilization.

*L. TEPPER*

*Office of Defense Mobilization*
*Washington*

### For Reference Only

Sir:

Several weeks ago we started receiving requests, addressed to the U. S. Atomic Energy Commission Depository Library, for a report on "Coatings for the Protection of Low Carbon Steel at Elevated Temperatures." A few of the requests mentioned THE IRON AGE as the source of the information that we could supply the report.

Upon investigation, I found that in the query column of your Feb. 12 issue an inquirer was directed to "write to the U. S. Atomic Energy Commission Depository Library, Princeton University Library, Princeton, N. J. for the report. . . ." This answer to an inquiry from a New Jersey correspondent has evidently been interpreted by your readers to mean that this library has copies of the report for free distribution.

As a matter of fact, our depository collection of AEC documents consists of a single copy of each document received from the Atomic Energy Commission. We have no copies for distribution. There are forty other AEC depository libraries in this country, in all of which, presumably, the report could be found. I have been explaining this situation to the persons who have requested copies, have told them that all I could supply was a photoduplicate, and have supplied the name of the AEC depository library nearest them, where they might at least see the report.

As requests are still coming in for the report, it might help matters if you were to amplify your earlier statement along the lines indicated above. Also for easy reference the number of the document should be included—ORO-79—when inquiries are made of other AEC depository libraries.

*M. L. CARLL*
*Departmental Librarian*

*Princeton University*
*Princeton, N. J.*

**Of course, the AEC depository libraries cannot mail copies of AEC reports but they can be seen at any one of the 40 depository libraries located throughout the United States.—Ed.**

### Long Glove Life

Sir:

Will you please advise us the name of the Detroit firm that reconditions plastic gloves as mentioned on the Newsfront page of your Feb. 19 issue.

*R. D. JOHNS*
*Director of Materials*

*Superior Coach Corp.*
*Lima, Ohio*

**The name of the firm is the U. S. Industrial Glove Corp., 9350 Roselawn Ave., Detroit.—Ed.**

### Plastic Dies

Sir:

On p. 115 of your Feb. 19 issue you have an article about plastic dies. We do not have a tool room of our own, but purchase all die equipment from outside sources.

Can you give us the names of one or two companies who might work with us on the type of plastic die described in your article, preferably in the Chicago area

*M. PRICE*
*President*

*Arterest Mfg. Corp.*
*Chicago*

**Write to Dozier-Eastman & Co., Bendix Bldg., Los Angeles 15, Calif. or Warren Plastics, Van Dyke, Mich. who will be able to give you local manufacturers.—Ed.**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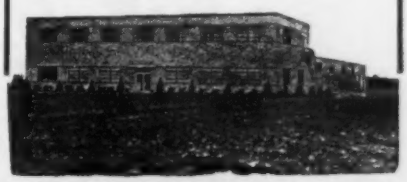

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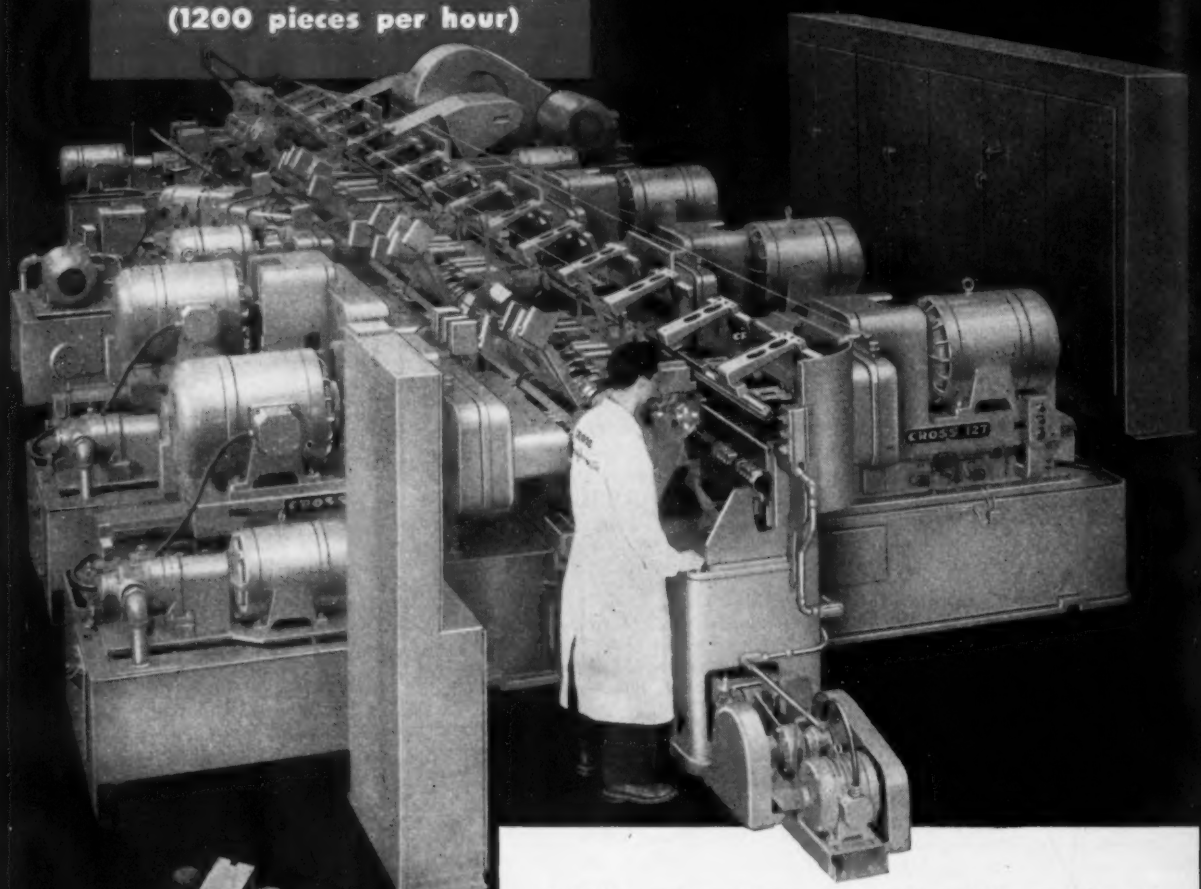
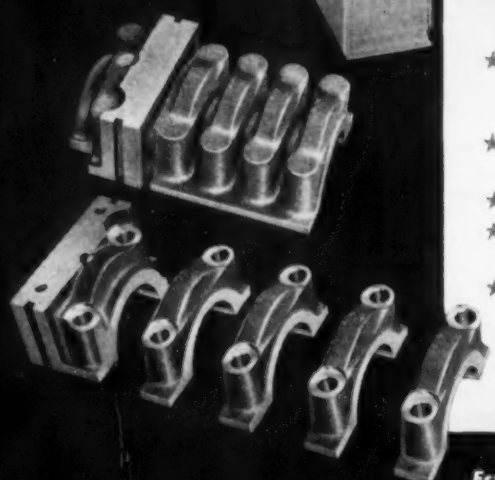
Detroit, Mich. • Chicago, Ill.

# Mills, Drills, Spotfaces and Taps Bearing Blocks

(1200 pieces per hour)

*Another Transfer-matic by Cross*



★ Drills and spotfaces stud holes; drills angular oil hole; drills and taps two screw holes; mills bearing lock slots; and saws into five individual pieces.

★ 240 bearing block sets (1200 pieces) per hour at 100% efficiency.

★ Capacity for machining two sets of parts at a time.

★ Two heavy-duty, 25 hp, vee belt drive, milling spindles for sawing operations.

★ Other features: Built-in chip conveyor, automatic lubrication, overhead transfer mechanism, gravity operated cam clamping for work holding fixtures, J.I.C. hydraulic and electrical construction.

*Established 1898*

THE CROSS CO.

DETROIT 7, MICHIGAN

*Special* MACHINE TOOLS

# Fatigue Cracks

*by William M. Coffey*

### La Belle Springtemps

Mar. 19. High Tide at Boston is at 1:45 A.M.

* * *

And here's an Ode to March, taken from the Farmer's Almanac:

*Who opened the dread gale's enormous door*
*And let him out?*
*And later were surprised to hear the roar*
*Diminish to a shout,*
*And dwindle to a whine that might have been*
*The sick hound coming home, and let him in?*

* * *

It also says it is now well to get to your plowing and fertilizing as soon as possible.

* * *

**If you're troubled with WARTS, try TRAW, an amazing liquid that quickly and easily removes ugly, embarrassing warts — leaves skin smooth and beautiful. No pain— horny growths dry up. WARTS GO! Send $1.00**

* * *

Anyone near Lat. 59° 56' 58" can plant Leek any time after today.

### Morale All Busted

The United States Time Corp. reports that "sweater girls" are definitely not wanted in any of its manufacturing plants. Young women applying for jobs are advised (contrary to everything we've heard) to leave their sweaters at home. Not why you think, though.

It's simply a matter of lint. Seems lint is an enemy of watchmaking. Every time a girl wearing a sweater tosses her arm an unseen quantity of lint gets into the watch works and fouls up the time. Mr. McFadden, personnel director, says, "Don't get me wrong. We don't object to sweaters as such. For instance, girls in our offices are not forbidden to wear them." We knew those white collar workers weren't suffering as much as the UN claims.

### Announcements

The Institute of Metallurgists, 4 Grosvenor Gardens, London, announces that His Royal Highness, The Duke of Edinburgh, has graciously accepted election to Honorary Membership of the Institution.

* * *

Tau Beta Pi, the National Engineering Honor Society, Nashville, Tenn., announces that Bob Hatschek, Associate Editor of THE IRON AGE, has been elected to Active Membership. Graciously accepted.

**The United States Navy announces a new, "itchless" underwear to replace the traditional woolen winter underwear.**

* * *

Russia announces that a British worker must labor 600 minutes to buy a bottle of whiskey while a Russian worker can get a bottle of Vodka for only 340 minutes. Hangovers are cheaper in Russia. (An American worker can buy a pint with about 10 minutes labor. Old Turpentine).

### Puzzlers

The answer to the apple-picking problem is 24 days. Here are the winners: Mr. F. Rondepierre, Mrs. Paul Kline, E. L. Faneuf, William F. Braasch, W. Farley, 3rd, C. E. Norton, John Demmler, G. K. Pflederer, E. A. Schwab, Albert A. Alles, P. Pozzi, Charles O. Talbergs, Suzanne L. Ogden and Mary E. Lanser.

Here are some late-comers to some older puzzles: Mr. William F. Braasch solved the beef problem and the movie-ticket problem; Mr. Fred Wetzler solved the check problem; Roger W. Payne and A. S. Foreman solved the tough ladder problem; Paul Tackett wins on the nearby-town puzzle; the Puzzle Club at Rheem Manufacturing Co., Whittier, Calif., under the chairmanship of Carl H. Souza solved the beef problem but was wrong on the column of soldiers puzzle. (Said 20 miles like most others); We have an apology to make to Mr. F. Rondieperre. He did have the right answer to the soldier one. G. K. Pflederer came through on the "lake" puzzle; William K. Steward solved correctly the apple, the old cow and fence and the ditch digging problems; Amandus Rottman, Jr. solved the ship, and boiler and the coin problem; J. Vernon Hunt solved the movie-ticket problem; James Rex solved the column of soldiers puzzle.

### New Puzzle

Mr. William F. Braasch, a steady puzzle winner, wants to try this one out, particularly, on Mr. Rice. It's in two parts and has two answers:

1. What are the dimensions of a one gallon cylindrical tin can closed on both ends so as to use the least number of square inches of tin?

2. What are the dimensions of a one gallon cylindrical tin can when one end is open so as to use the least number of square inches of tin?

*Your Headquarters*

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We purchase for our own account, selling out of stock, and we are in a position to place your orders for specific qualities-gauges-lengths and widths on a GUARANTEED DELIVERY BASIS.

From all indications the domestic steel sheet market will remain in tight supply during the balance of 1953, and we suggest you give serious consideration to WALWORTH QUALITY STEELS.

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# ease and economy

...with Super Service accuracy

● *Photo—Courtesy Aerojet—Division of The General Tire & Rubber Co.*

Working on rocket motors at Aerojet—Division of The General Tire & Rubber Company, this versatile 4′ 9″ column Cincinnati Bickford Super Service Radial is economically drilling and tapping in type 347 stainless steel.

Class 3 fit is required on the tapping operations of these $\frac{1}{2}$″ x 20″ and $\frac{7}{16}$″ x 24″ holes.

In this unusual installation a 12-foot pit permits processing of large work in vertical position, while another piece is set up on large V-block fixtures on plain box table.

The centralized controls clear view Bickford Head, and wide selection of speeds and feeds all bring ease and economy on this job.

Write for Booklet R-21-B.

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**RADIAL AND UPRIGHT DRILLING MACHINES**

**THE CINCINNATI BICKFORD TOOL CO.**

**Cincinnati 9, Ohio U.S.A.**

The Iron Age
FOUNDED 1855

# THE IRON AGE Newsfront

THE ORE SHIPPING SEASON is not expected to start until after April 1st, despite optimistic rumors. Repairs on some larger Great Lakes vessels are not complete; there's cold weather in the locks area. Present stocks are still in fairly good shape and there is no pressing need to reopen early.

SOME FLATCAR SHORTAGES are reported in the Midwest. But these are regarded as temporary and a welcome indication the spring farm equipment selling season is getting underway.

TITANIUM EXPERIMENTATION continues to grow. Work is now in the laboratory stage for production of titanium fasteners. These will be designed for use by the aircraft industry.

A FILM RECORDING PROCESS for storing televised information has moved another step forward with development of an electronic shutter. It's controlled by a cycling pulse generated in the motion picture camera.

ELECTRICAL PROPERTIES OF STAINLESS STEEL WIRE have been found to be closely related to wire drawing speeds. Very high speeds may not permit complete cooling, affect the austenite to martensite transformation.

SOME SCRAP CONSUMERS are considering hiring outside inspection agencies. These inspectors would check scrap at dealers' yards before shipment. The matter was discussed at a recent meeting of consumers but no concerted action was taken.

STEEL PLANT MODERNIZATION and expansion since 1946 has cost industry an average $180 per net ton of additional capacity. But this figure includes modernization of finishing facilities. Ingot capacity alone has been expanded for as little as $16 a ton. A new completely integrated mill may cost as much as $300 per ton of net capacity.

A PLASTIC TYPE COATING USED to line steel drums now permits shipping of food in large containers. Drums can be reused just as are other refillable containers such as beer and milk bottles.

NICKEL SUPPLY LOOKS WORSE for the second quarter. The jet engine program, already going strong, is expected to continue to gain. Molybdenum supply has improved but surplus is being stockpiled.

NEW DEVELOPMENTS IN BRAKE DESIGN AND MATERIALS are in the wind. Brake drums on larger new cars are operating at near capacity. One company is developing an aluminum alloy, bi-metallic drum. Heat dissipation is now as important as holding capacity.

LIGHTER, MORE EFFECTIVE SHIELDS for atomic powered planes will result from calculating methods developed at Lewis Flight Propulsion Laboratories, Cleveland. The work is part of a team effort to design an atomic-powered plane that will fly around the world without refueling.

# FABREEKA *Pads*

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**FABREEKA PADS IN THE STEEL INDUSTRY**

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Forging Hammers, Hydraulic Presses, Stamping Presses.

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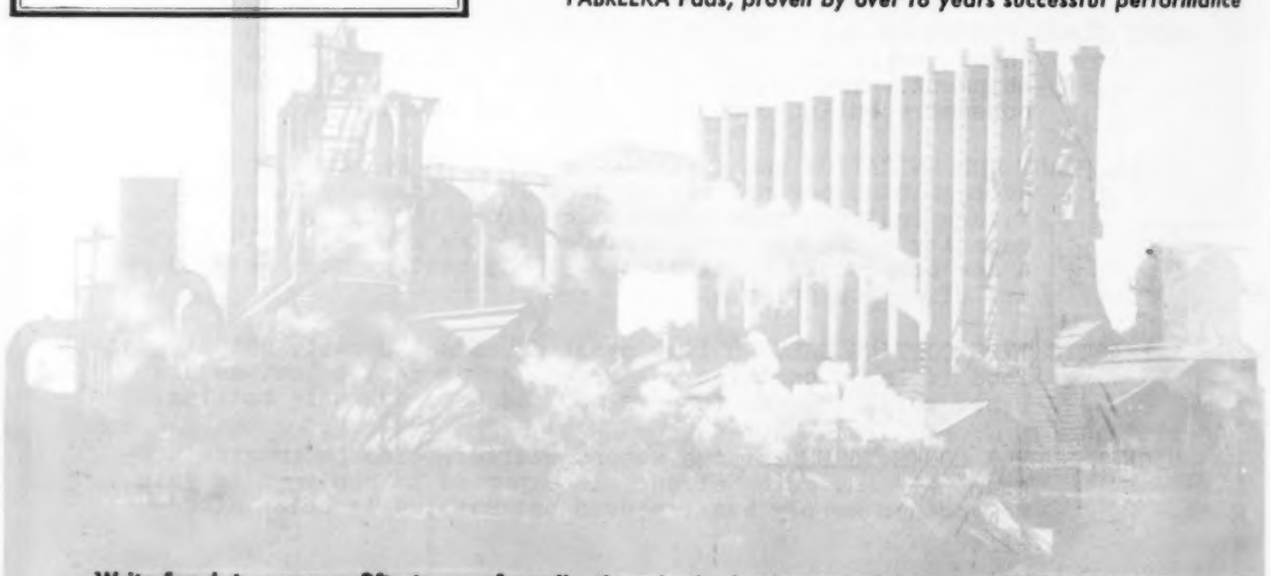
**Protect Foundations and Machines, Cut Maintenance Costs and Improve Production**

*For severest service under heavy loadings, it pays to specify FABREEKA Pads, proven by over 18 years successful performance*



**Write for data on over fifty types of applications in the basic steel and metal working industries.**

## FABREEKA PRODUCTS COMPANY, INC.

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NEW YORK CHICAGO DETROIT SPARTANBURG PHILADELPHIA PITTSBURGH

The Iron Age
FOUNDED 1855
News Section

# DIECASTING: Growing Like a Beanstalk

**Dollar volume of job shop sales nearly six times greater than 1936 . . . Demand high . . . Light metal use zooming . . . Supplies better . . . Seek brass method—By *R. L. Hatschek.***

Sales by job shop diecasters in 1952 were nearly six times the value of industry sales in 1936. And the growth to $244.5 million of last year was a fairly steady rising curve without many recessions. Even considering steadily rising costs and prices during the 16-year period, this is a remarkable record.

Increasing output of captive shops presents a similar picture.

A prime factor in this growth has been increasing acceptance and familiarization of engineers and production men with diecastings and their special merits.

As companies set up small captive diecasting units, their designers became more diecasting-conscious. Result has been more and more of them incorporated in company products—so many that often captive shops could no longer turn out sufficient volume. So firms had to buy their diecastings elsewhere.

### Autos Take Most

The automotive industry is the largest single consumer, taking some 47.6 pct of zinc, 22.7 pct of aluminum and 27.9 pct of magnesium diecastings produced by job shops in 1952. These figures do not include military vehicles. It's estimated that the auto industry also operates approximately 90 pct of all captive diecasting shops.

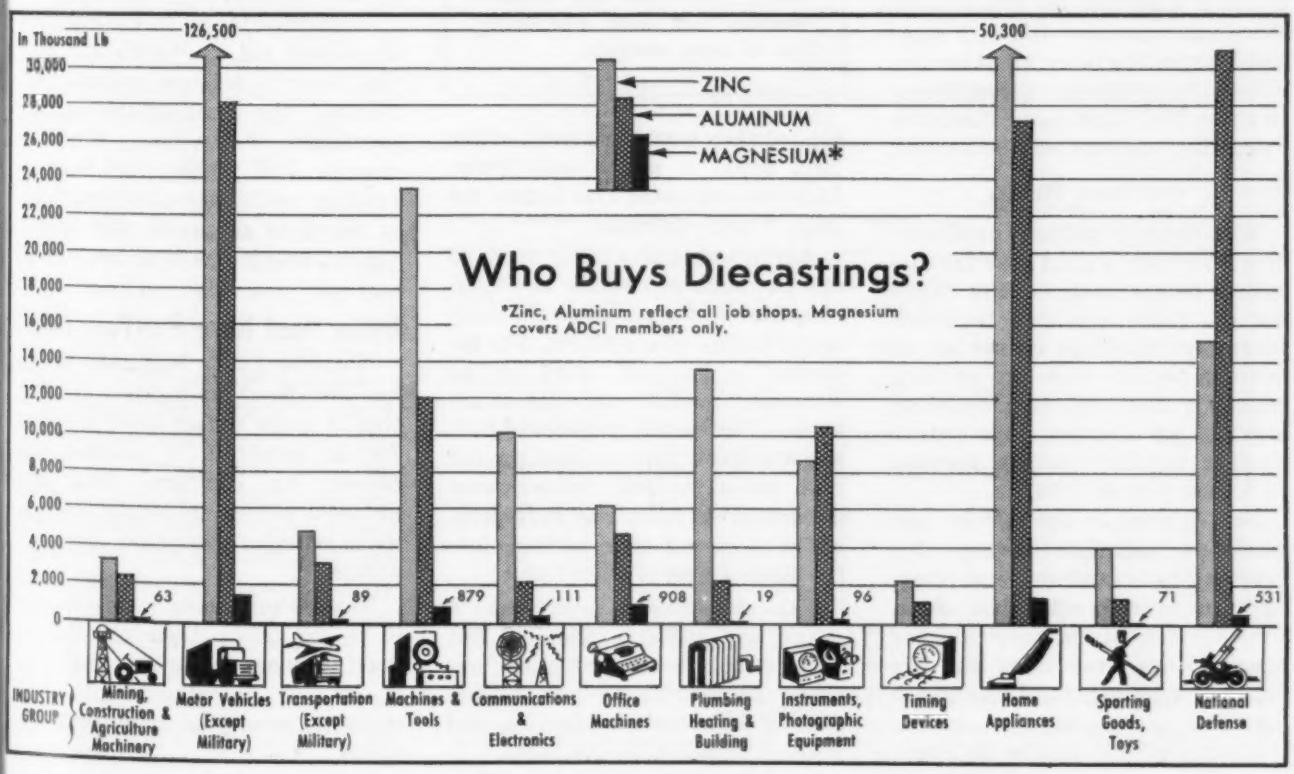
Government production limits, coupled with last summer's steel strike, severely cut into sales in 1952. Smaller production of durable goods, particularly automobiles, meant that fewer diecastings were needed. Even so, sales of aluminum diecastings showed a net gain of 10,750 tons. And magnesium rose about 10 pct, estimates the American Die Casting Institute.

But zinc showed a net sales drop of 13,000 tons. Military use was off 5000 tons; motor vehicle, 5500 tons; other transportation, 2250 tons; home appliances, about 1500 tons; and plumbing, heating and such, about 1000 tons.

Offsetting the declines were increases of 1000 tons in industrial and commercial machines and 1250 tons in communications and electronics equipment. Job shop use of zinc totaled 203,000 tons in 1952.

Of the 10,750-ton net gain registered by aluminum diecastings in 1952, 6000 tons were in the military category; 4000 tons in motor vehicles; and 750 tons in other transportation manufacturing.

Home appliances, electronics and



construction machinery also used more aluminum diecastings in 1952. On the red side of aluminum's ledger were industrial machinery, plumbing and heating, and photographic and optical industries. Total consumption of aluminum was about 78,000 tons.

Major boosts among users of magnesium diecastings were scored by industrial and commercial machines, tools and equipment, and office machinery. Motor vehicles and military showed the largest declines in use.

This year is shaping up as a better one than 1952. At the end of last year zinc diecasting was running 15 pct ahead of the year's rate, aluminum was 35 pct higher, and magnesium was about 7 pct ahead of 1952 levels.

### Set New Record?

Present indications are that these rates will increase even more during the first half and no one would be surprised if production of aluminum diecastings would set a new all-time high this year. Some diecasters are very bullish on aluminum's future.

Trend toward automatic transmissions is boosting aluminum strongly. Light weight of aluminum makes it a natural for impellers in these transmissions. And with some people expecting to see all passenger cars with automatic transmissions in a very few years, more aluminum diecasting capacity will be needed.

### Get More Metals

With the auto industry producing at a high rate, a good year for diecasters seems a cinch. But that's not all. Home appliance manufacturers are also high on the list of buyers, taking 18.9 pct of zinc castings; 21.3 pct of aluminum; and 22.1 pct of magnesium. This is another industry looking forward to a good year in 1953.

Raw materials outlook is also good this year. Zinc shortage of a year ago has evaporated and prices have nose-dived since last June. Under price controls, the ceiling for Special High Grade zinc was 21¢ per lb. It now sells for 12½¢ per lb delivered to consumer.

Aluminum is beginning to loosen up, though the price picture is the reverse of zinc. Most aluminum used by the diecasting industry is secondary metal and prices jumped as soon as ceilings were ended by the government on Feb. 12.

### Seek Die Material

Magnesium is plentiful and has been for almost a year. Prices, stable since 1950, have just been boosted 2¢ to 3¢ per lb. And many in the automotive industry have indicated they would use more of the light metal if prices were lower. This was expressed even before the Mar. 9 price increase.

Advances are also being made on the technical side, such as experiments now in progress on the automatic ladling of aluminum. The industry is hard at work on an economic method for diecasting brass. Crux of this problem is finding a suitable die material for the high pressures and temperatures necessary. It must also have properties to permit easy working into the die's shape.

This development might take 5 years, say industry sources. But when it does become practical, another considerable boost in the diecasting industry's production and sales is definitely in the cards.

## Kills All Price Controls

**Office of Price Stabilization Tuesday lifted all remaining price controls, including those over steel, machinery, and other industrial products. Action is effective immediately.**

**All remaining price controls over consumer goods were lifted last week.**

**Action leaves the nation's economy free of all direct price controls, except for rent controls in some areas.**

**The OPS action is the seventh and final step resulting from President Eisenhower's January request for orderly decontrol of all prices.**

**This is the first time since Feb. 7, 1951, that the nation's economy has been completely free of price controls.**



## Featherbedding Upheld by Court

**"Make-work" demands by unions do not violate the anti-featherbedding provisions of the Taft-Hartley law, so long as the union concerned offers some work or service in return for the pay demanded, the U. S. Supreme Court has ruled.**

There is no violation of the law in such cases, the Court holds, even though the work or service performed may be useless or wasteful, and the employer specifically states that he "does not want, does not need, and is not willing to accept" the services.

Taft-Hartley act declares it an unfair labor practice for a labor organization or its agents "to cause or attempt to cause an employer to pay or deliver or agree to pay or deliver any money or thing of value, in the nature of an exaction for services which are not performed or not to be performed."

Dissenting justices observed that useless and unwanted work which wastes material and facilities is worse than no work. They maintained that the practices at issue before the court were prohibited by Taft-Hartley.

Next move is up to Congress. It is pointed out at the Capitol that the Court's decision makes ineffective the anti-featherbedding provisions of the law. Moves to rewrite and tighten up featherbedding restrictions are unofficially slated to get under way at the Capitol within the next few weeks.

## Union Must Have Pre-Vote Time

National Labor Relations Board has broadened its doctrine holding that it is an unfair labor practice for an employer to address employees on company time and premises before an NLRB election while refusing unions the same opportunity.

New ruling holds such conduct to be an unfair labor practice in itself, without requiring proof that it actually interfered with the right of employees to organize a union.

# STEEL: Wage Hikes Would Boost Prices

**Industry feels it can absorb no more pay boosts without fully compensating price increases . . . Union contracts reopenable for wage talks after May 1—*By W. V. Packard.***

Steel firms will approach the bargaining table this year firmly resolved that there can be no wage increase without at least a fully compensating price increase.

Their resolve will be backed by plenty of statistical ammunition in the battle of the slide rules for which both sides are quietly preparing behind the scenes.

### It's Coming Soon

Time is getting short. Although the contract with the United Steel Workers of America runs to June 30, 1954, it is reopenable on wages by notice given on or before May 1 this year. Following notice, bargaining must begin within 30 days after May 1. If no agreement is reached by midnight June 30 union or company may resort to strike or lockout.

In the near future David J. McDonald, newly installed president of USW, will call a meeting of the wage policy committee to draw up a program for bargaining. That the program will include new wage demands is taken for granted.

### Delay Good Will

Proximity of wage negotiations is one of the reasons plans for a "good will tour" by Ben Fairless, U. S. Steel Co. chairman, and the late Phil Murray will stay tabled —at least until after the wage question is settled this summer.

Following Mr. Murray's death last fall and election of Mr. McDonald to succeed him, both Mr. Fairless and Mr. McDonald reaffirmed their intention of carrying out the "grass roots" meetings to deal with little problems before they became big ones. But Mr. McDonald's inauguration as president of USW didn't take place 'til last week. And now seventh-round wage negotiations are just around the corner.

Union efforts to win new wage concessions will be countered by industry figures showing that costs of steel wages and purchased goods have risen much faster than steel prices since the war. (U. S. Steel's annual report for 1952, released this Wednesday, demonstrates this point forcibly.)

Management will also point to the cost-of-living index which has risen only 0.6 pct in the past year, and has recently been slipping. (January figure was the lowest in 6 months.) Unless prices advance following decontrol this will be a potent factor in industry efforts to hold the wage line.

Labor is expected to insist (as it has before) that higher wages are needed to keep purchasing power up and forestall a recession.

Steel industry leaders still have a bitter taste in their mouths from the shellacking they took under price and wage "stabilization" last summer. They ended up giving a 25¢ an hr wage package (biggest in history) and were allowed a price increase averaging only $5.20 a ton. Government attributed more than two-thirds of the price increase to past cost increases and less than one-third to the wage increase. Industry frustration is obvious.

Industry bargainers will recall this and use it in their efforts to hold the wage line. They will also point out that industry earnings in 1951 were off 13 pct from 1950, and that they declined further in 1952 (THE IRON AGE has estimated 1952 earnings were down 20 pct).

### Sales Earn Less

Steel income as a percent of sales has declined too. U. S. Steel's return on sales was 7.3 pct in 1950, 5.2 pct in 1951, and 4.6 pct in 1952.

Betting is that even though bargaining may get hot there will be no strike. Memory of last summer's costly shutdown is still fresh in the minds of both sides.

If the union is finally able to wangle a modest wage increase, it will be fully covered by higher prices.

## U. S. Steel Wage Costs vs. Purchases, Prices

| Period or Round | Date Cost Increase | Period Covered | Increase as Pct of 1940 | | |
|---|---|---|---|---|---|
| | | | Employment Cost (a) | Cost of Purchases (b) | Steel Prices (c) |
| World War II<br>ROUND I | Apr. 1941, Sept. 1942<br>Nov. 1944, Feb. 1946 | Jan. 1941–Feb. 1946<br>Feb. 1946–Apr. 1947 | 56 | 47 | 20 |
| ROUND II | Apr. 1947 | Apr. 1947–July 1948 | 16 | 42 | 17 |
| ROUND III | July 1948 | July 1948–Nov. 1949 | 14 | 18 | 20 |
| ROUND IV | Nov. 1949 | Nov. 1949–Dec. 1950 | 19* | 3 | 8 |
| ROUND V | Dec. 1950 | Dec. 1950–July 1952 | 23 | 24 | 13 |
| ROUND VI | July 1952 | July 1952–Dec. 1952 | 27 | 4 | 9 |
| Total Increase as Pct of 1940 | | | 155 | 138 | 87 |

(a) Based on average hourly employment cost (excluding provision for past service pension cost) for U. S. Steel wage employees engaged in steel operations.
(b) Based on U. S. Steel's average cost in steel operation of purchased products and services per ton of steel shipped.
(c) Based on prices as measured by a comprehensive index, computed by U. S. Steel, of published selling prices, f.o.b. mill, of its steel products.
Increases in the items are measured as the differences between their average amounts in a representative period immediately preceding the start of the period or round and their average amounts in a representative period immediately preceding the start of the next succeeding round.
*Increase due primarily to granting of pension and insurance benefits.

# KITCHENS: Republic Woos The Ladies

**Steel firm markets own line of stainless steel kitchens . . . Had been making them for other firms . . . Plans full-scale output, sales effort . . . Market potential high—By R. M. Lorz.**

It's a long way from the Mesabi to milady's kitchen, but Republic Steel Corp. is bridging the gap as the first basic steel producer to go into the retail field.

Less than 2 years ago Republic was making kitchen units for other firms. When one of the Cleveland firm's customers decided to start fabricating cabinets itself a decision had to be made.

### "Go All Out"

In the words of one Republic executive, "We decided we would either have to go all out or get out." Republic didn't get out. Instead the firm spent thousands of dollars on a national survey to determine market possibilities. After the returns were in Republic set up a sales organization and went into business.

It wasn't quite as simple as it sounds because the corporation first had to spend over a million dollars in retooling its Berger Manufacturing plant at Canton, Ohio.

Actual production began at the Berger plant last Jan. 29 and since then monthly turnout has been increasing. Although corporation executives say it is still too early to estimate peak production, it should run well over 40,000 units annually to keep up with the demand.

### Starts Strong

When the venture was launched President Charles M. White left no doubt that Republic was in the field to stay. In reporting the firm's decision, Mr. White said, "The resources and skill of the entire Republic Steel Corp. will go into the manufacture of the new steel kitchens."

Republic's hard hitting program paid dividends almost immediately, as its new sales organization brought Marshall Wells Co. of Duluth into the fold. Wells, a firm which delivers kitchen units to some 1100 dealers throughout the Northwest, did a $93,747,836 business in 1951.

END OF THE LINE for Republic range. It will be complete after hardware is added.

Importance of that first "sale" is magnified by the knowledge that the dollar value of entire stainless kitchen market in the U. S. today is estimated at $250,000,000.

To keep the ball rolling Republic has spotted nine district representatives throughout the United States and Canada. Their aim is to sell home owners on the design, durability, beauty, utility and competitive price of stainless steel kitchens.

Competitors like Youngstown Kitchens, American, Geneva and others aren't standing still. In their effort to corner a fair share of the market these firms are concentrating on design, more aggressive sales training and wide-awake promotion.

Even the most pessimistic forecaster has to admit there seems to be enough pie for everyone. A brief rundown on future market possibilities uncovers some impressive statistics.

### Market Is Big

U. S. census figures show there are about 41 million dwellings in the U. S. today. Over 20 pct of these are homes 20 years old and they should be good prospects for remodeling. Some sources indicate that 8 pct of the families in America do modernize each year. That means approximately 1,968,000 kitchens are going into these older houses every year.

According to Housing & Home Finance Agency, new home needs for the next few years—up to 1960—will run as high as 1,600,000 per year. Further breakdown of that estimate points to 600,000 new dwelling units; 40,000 disaster losses; 770,000 replacements for substandard and deteriorating dwellings and 200,000 new farm dwellings. By lumping remodeling demands with new dwellings, Republic executives estimate the total annual demand at 3,578,000 new kitchens.

If the average unit retails for about $350, estimated retail sales for a year should reach a whopping $1,252,300,000.

### Personalize It

Readers not easily impressed by statistics might consider another important factor. Instead of designing the perfect kitchen for "women", producers are today concentrating on an individual market. Marketwise retailers say a woman's kitchen these days has to be as distinctive as her hat. That should mean a greater variety of models, new ideas—and increased sales!

Use of colors, decals and tailored cabinets that blend with wallpaper and drapes is just one approach. In the stainless field smoothness of line and hidden attachments are esthetic selling points.

# PLANT LAYOUT: Three Dimensions Help

**Visual planning with three dimensional scale models saves time, money . . . Prevents costly errors . . . Possible to get blueprints from model layout within 1 hr—By *E. C. Kellogg.***

Plant layout changes needed at Hill Air Force Base in Ogden, Utah, couldn't be made, because the Air Force, like many industrial firms, couldn't find enough engineers and draftsmen to do the job.

This shortage of skilled personnel caused the Hill engineering staff to experiment with three-dimensional scale models. After successful but expensive tests with homemade units, the Air Force called in Visual Planning Equipment Co., Inc., Oakmont, Pa., to do the model designing.

### Get Blueprints Fast

In addition to making precise scale models of everything ranging from the boss' waste basket to elaborate special machine tools, Visual's service includes a patented method of developing finished blueprints from a model layout in less than 1 hr.

The company estimates that blueprints can be obtained by its method in one-twentieth the time required by conventional drafting procedures. With draftsmen averaging $3 to $5 per hr, the savings are considerable.

Harvey Smith, manager of Kaiser-Frazer's Aircraft Div., has stated that Visual's service, used to convert 3 million sq ft at K-F's Willow Run plant, saved 27,800 man days.

### Make Changes

Hill Air Force Base first used Visual's three-dimensional models to make changes in its carburetor shop. It discovered that visual planning not only saves time and money, but also makes it possible for non-technically trained people to understand layout problems.

Many valuable suggestions on safety, materials handling, production control and fire prevention were made by people unable to understand engineering drawings.

Visual's method of producing blueprints from the model layout stage, highly praised by the Air Force, is extremely easy to use. After the models have been arranged in their desired position on top of a transparent Lucite model of the plant floor, they are firmly attached to the Lucite base with pressure-sensitive cement.

The layout is turned upside down so that the "floor" is on top, and a sheet of transparent film with scaled grid marks is placed over the Lucite floor.

Film cutouts are supplied with each model and represent an exact duplicate of the model's base area. These cutouts (Repro-Templets) are pasted on the grid-lined film sheet directly over the appropriate pieces of machinery.

Since the Repro-Templets all bear the name of the machine they represent, this lettering appears on the final blueprint.

After all the cutouts have been pasted on the film sheet, the sheet is removed and developed by any standard reproduction method (blueprint, Ozalid, photostat).

Success of visual planning at Hill Air Force Base has made the process standard engineering procedure at many Air Materiel Command bases around the country. Visual has also provided its model and Repro-Templet service for Army and Navy layouts and estimates military use accounts for half its business.

### Figure Cost Immediately

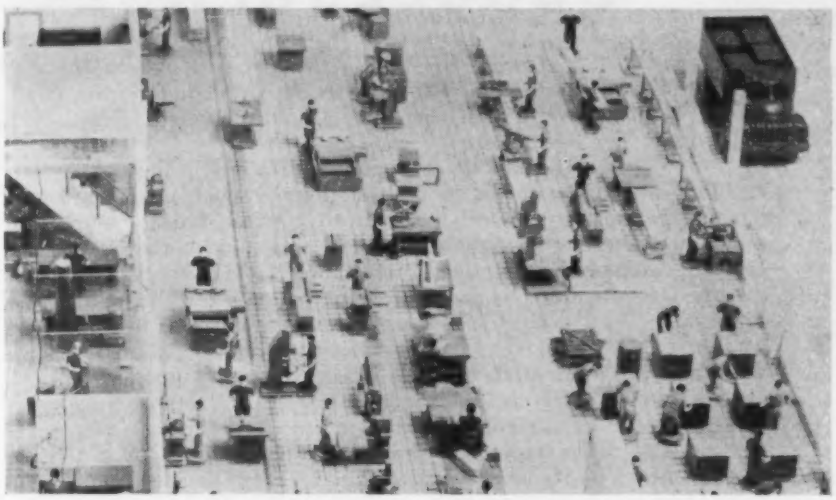
In the last 7 years, Visual's layout method has been employed by 528 plants. Among them are: General Electric, International Harvester, Western Electric and Chain Belt Co. Largest single order was for $70,000—smallest, $57.

Any manufacturer interested in finding out how much Visual planning will cost can do so with a phone call.

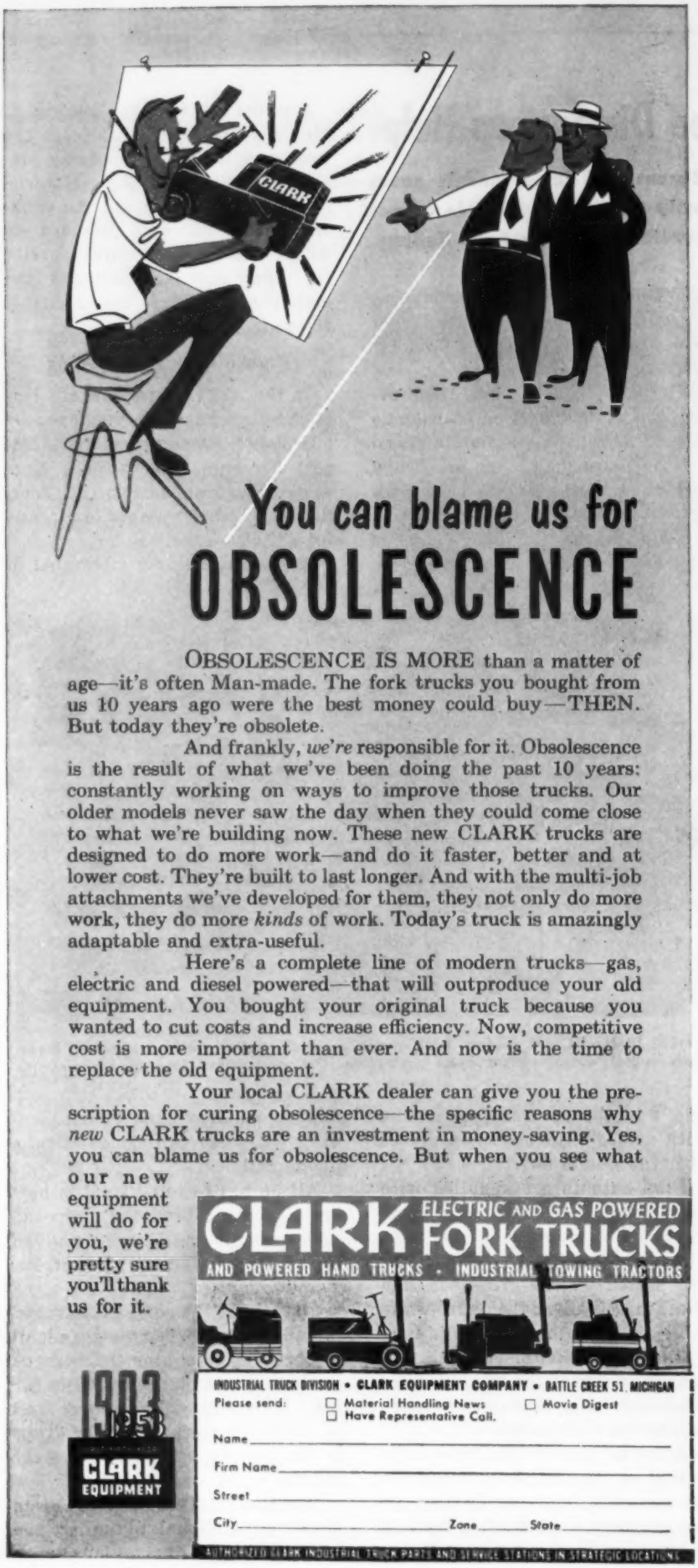
All he has to tell Visual is how large a plant area the proposed layout covers and he will be given an accurate estimate of cost immediately.

Charge for the complete service, including Repro-Templets and all machinery and equipment, is made on the basis of plant area. Cost for installations of 25,000 sq ft and under is 10¢ per sq ft. Price drops to 6¢ per sq ft for areas over 200,000 sq ft.

If a manufacturer decides to go ahead with Visual planning, the next step is to supply Visual with



THREE DIMENSIONAL models enabled non-technically trained people at Hill Air Force Base to make valuable plant layout suggestions. Use saves money, time and limits errors.


CLARK
You can blame us for
OBSOLESCENCE
OBSOLESCENCE IS MORE than a matter of age—it's often Man-made. The fork trucks you bought from us 10 years ago were the best money could buy—THEN. But today they're obsolete.
And frankly, we're responsible for it. Obsolescence is the result of what we've been doing the past 10 years: constantly working on ways to improve those trucks. Our older models never saw the day when they could come close to what we're building now. These new CLARK trucks are designed to do more work—and do it faster, better and at lower cost. They're built to last longer. And with the multi-job attachments we've developed for them, they not only do more work, they do more kinds of work. Today's truck is amazingly adaptable and extra-useful.
Here's a complete line of modern trucks—gas, electric and diesel powered—that will outproduce your old equipment. You bought your original truck because you wanted to cut costs and increase efficiency. Now, competitive cost is more important than ever. And now is the time to replace the old equipment.
Your local CLARK dealer can give you the prescription for curing obsolescence—the specific reasons why new CLARK trucks are an investment in money-saving. Yes, you can blame us for obsolescence. But when you see what our new equipment will do for you, we're pretty sure you'll thank us for it.
CLARK ELECTRIC AND GAS POWERED FORK TRUCKS
AND POWERED HAND TRUCKS - INDUSTRIAL TOWING TRACTORS
1903 1953
CLARK EQUIPMENT
INDUSTRIAL TRUCK DIVISION • CLARK EQUIPMENT COMPANY • BATTLE CREEK 51, MICHIGAN
Please send: Material Handling News Movie Digest Have Representative Call.
Name
Firm Name
Street
City Zone State
AUTHORIZED CLARK INDUSTRIAL TRUCK PARTS AND SERVICE STATIONS IN STRATEGIC LOCATIONS

## —Expansion—

a plant floor plan and an inventory of equipment.

If blueprints of some of the machines listed in the inventory are not in Visual's extensive library, the company sends men to the plant to make drawings.

### Prevents Costly Mistakes

Experience of a New York textile firm proves that Visual planning not only saves money by eliminating draftsmen, but also prevents costly layout mistakes.

The company was building a silk weaving mill and had ordered a lot of new looms and other equipment. But when the firm began moving its scale models around, it found that the roof of the proposed plant was 6 ft too low for some of the new machinery.

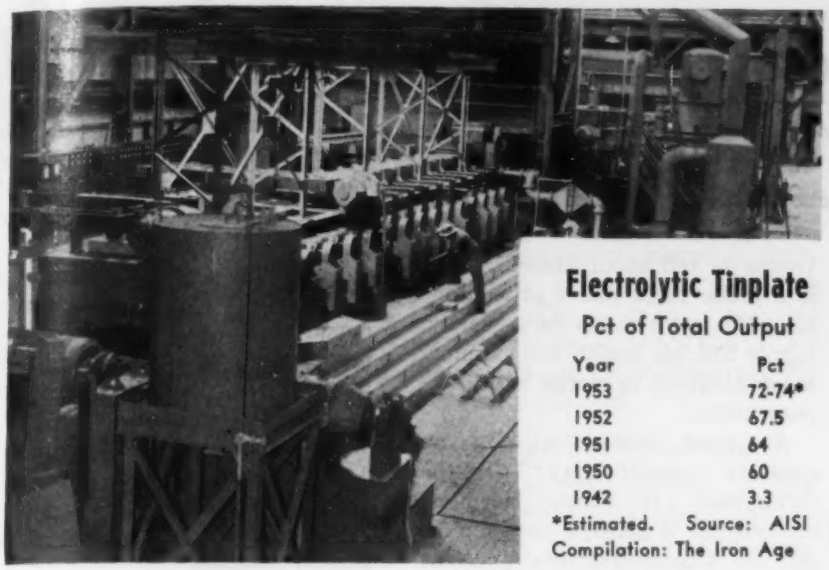
Fortunately changes could be made before the building was finished, and the firm saved an estimated $35,000.

## Burma Mine Output Rise Studied

Ways and means of stimulating output of minerals in Burma are being studied in Rangoon this week by Dr. Wilbur C. Schroeder, assistant director of the U. S. Bureau of Mines.

Burma has received a $605,500 U. S. grant to survey its mineral resources. Prior to World War II, it produced large quantities of lead, zinc, copper, silver, tin, and tungsten. Insurgent political activity since 1945 has resulted in a virtual shut-down of production.

"Sometimes this little number heats up so much I think we'll blow a fuse."



ELECTROLYTIC TINNING line at U. S. Steel's Fairless Works.

**Electrolytic Tinplate**

Pct of Total Output

| Year | Pct |
|---|---|
| 1953 | 72-74* |
| 1952 | 67.5 |
| 1951 | 64 |
| 1950 | 60 |
| 1942 | 3.3 |

*Estimated. Source: AISI
Compilation: The Iron Age

# TINPLATE: New Angles on Competition

**Industry reshuffles its competitive forces as dual-coat takes hold . . . Some electrolytic lines can produce more . . . Pittsburgh producers take initial lead—*By J. B. Delaney.***

Increasing acceptance of dual-coated electrolytic tinplate has brought about a reshuffling of competitive forces.

It has posed new problems for the producers, and it appears to have speeded by several years the decline of hot-dipped plate as a major factor in the industry.

Dual-coat has intruded a third dimension into the competitive picture in that some electrolytic lines are more adaptable than others to the production of dual-coat plate, based on the speed of the various types of equipment.

### Replacing Hot-Dipped

Dual-coat bearing a 1.00-lb coating on one side and 0.25 lb on the other is fast winning acceptance in many applications as a replacement for the hot-dipped product in the 1.25-lb grade.

Speaking before the National Canners Assn., D. F. Sampson of American Can Co. research department, indicated that this new product is giving service approximating that of 1.25-lb hot-dipped. About 1953 he said:

"The use of #100-25 differential plate this year will be determined by the extent to which plate of this quality can be produced."

Not only does dual-coat cost less than hot-dipped plate, but it saves between 35 and 45 pct of strategic tin otherwise needed.

### Take Early Lead

Pittsburgh district producers appear to have benefited most from the development of differentially coated tinplate—temporarily at least. The advantage fell to them because more than 40 pct of the nation's electrolytic capacity is concentrated in the area, and the major part of it is particularly adaptable to the production of this product.

The Florida, Texas, and West Coast areas constitute important markets for dual-coat, and the Pittsburgh producers are in a good competitive position to these consuming areas.

Market observers predict that this year close to 74 pct of coated tin mill products will roll off electrolytic lines. This compares with 67.5 pct last year, 64 pct in 1951, and 60 pct in 1950. A portion of the increase this year will be due to the rapid development of dual-coated plate.

Comparing the costs of differentially coated plate and hot-dipped, canners find dual-coat attractive. Estimated savings on a 46-oz can for packing tomato juice is more than 90¢ per 1000 cans by substituting dual-coat on the bodies. For grapefruit juice in the same size can, the savings could be as much as $1.35 per 1000 cans.

### Test New Product

Can companies and tinplate producers have spent months on research and experimental packing to test suitability of the new product. Results varied, but the plate has won general approval for the packing of tomato juices and whole tomatoes. Indications point to general acceptance in the near future for such products as grapefruit juice, peaches.

Peak demand for dual-coat is expected to be reached in third quarter when harvest seasons materialize almost simultaneously for tomatoes, tomato products and peaches, followed by preparation for the citrus fruit pack which starts in October.

Most of the major producers are producing the dual-coated product, and the others are expected to follow suit as they learn more about handling the material and adapting it to their lines. Indications are that lines to be installed in the future will be designed with the dual-coated product in mind.

## Freight Car Deliveries Rising

American Railway Car Institute reports that a total of 7780 new domestic freight cars were delivered during February.

This marked the third month in succession when deliveries exceeded 7000 cars after the 1952 low point of 3762 units last September.

Total for the first 2 months of 1953 is 15,761 units, slightly less than for the same period last year.

# SALES: Pick Right Man for Right Job

**Intensive training is half-way measure unless right man's picked to train . . . How to do it with "deeper" interviews, application blanks, and psychological tests—By T. Metaxas.**

If you the manufacturer are using lamb-type salesmen against wolf-like competition, you may be relying on sales training and pep talks to even up the battle.

But no matter how intensive your sales force build-up, if you have not picked the right men to train you are investing in a half-way measure. A salesman's attitude, interests, personality, mentality, and background must be found favorable before you let him draw an advance.

Selection of salesmen by some companies remains haphazard, relying on a sketchy application blank and naive interviews.

### Three-Stage Testing

The Klein Institute for Aptitude Testing, New York City, told THE IRON AGE that some firms must reinforce their salesman selection techniques with more comprehensive application blanks, personal interviews in depth, and with aptitude and other psychological tests. The first two steps are a manufacturer's responsibility and the third should be entrusted to experts.

Interview, application form and tests should dwell on answering three important questions: Does the man fit the job? Will he stay with you? And will he grow?

The interview seeks to determine a man's attitude and features of his personal life. Unfortunately, many companies interview to appraise only the "surface" of the prospect. Too often questions seeking an interviewee's attitude and interest are too obvious.

Eager to impress, an applicant is always willing to reply to a direct question with what's expected.

### Probe Man's Attitudes

Klein Institute has compiled a list of Projective Interview Questions which encourage the interviewee to tell about himself. This is a probe for a man's attitudes—his adjustment to his field, society, family life, his health and stamina, his willingness to merge with company policy.

A typical question is: "Do you consider yourself lucky?" To the interviewee it seems harmless enough but it betrays his opinions on his accomplishments and his pessimism or optimism.

### Will Applicant Stick?

Often a manufacturer uses an application blank merely to put a sales applicant on record. It may be fodder for filing—but it's not an instrument to bring out the broad details of a man's background. A man's history is many times the basis for his future.

Designing this form to gather up the facts of a man's background makes possible evaluation of his worth. To determine whether a man will stick, Klein Institute has listed several "knockout" factors which an application blank should uncover.

Has he been flitting from residence to residence? Is he recently separated or divorced from his wife? Has he gone hog wild on credit? Was he making so much money before that doubts arise as to why he wants this position—and will he be satisfied with less money for long? Has he flopped in his own business—and if so is he incapable or if he has suffered hard luck, will he try again soon?

Are there unexplained gaps in his employment record?

The application blank must be comprehensive, covering such seeming incidentals as self-support during college, medical and military records, what jobs were liked best and least, family and economic status, hobbies, insurance, breakdowns of past earnings. Thus, an application form doesn't just happen—it's designed to produce the wanted answers.

"Is your—ah—keeper in?"

### Experts Take Over

In these first two steps, selection has been entirely up to the sales manager but after the culls have been screened out, survivors get six aptitude and psychological tests, nine to sales engineers. Taking about 4½ hr to complete, the tests are shipped to Klein Institute.

If a firm has employed Klein before it has on file a Sales Job Information Questionnaire. Really a thorough job analysis, this gives Klein industrial psychologists a base against which to measure.

In salesmanship there is room for a multiplicity of talents and degrees of ability. Psychologists measure a man on his ability to perform the specific job in question.

After 48 hr, back to the sales manager comes a Graphic Test Analysis which marks tested qualities of the applicant in three zones—danger, desirable, and caution. The six tests cover mental ability, personality portrait, social intelligence, personal adjustment, sales aptitude, interests other than selling.

Yet the proof of the testing is in its interpretation. With the 3-zone score sheet comes the prose analysis of test responses. This pinpoints weaknesses and strength, alerts management to possible consequences of both. At the report's conclusion is a recommendation to either hire or reject the man.

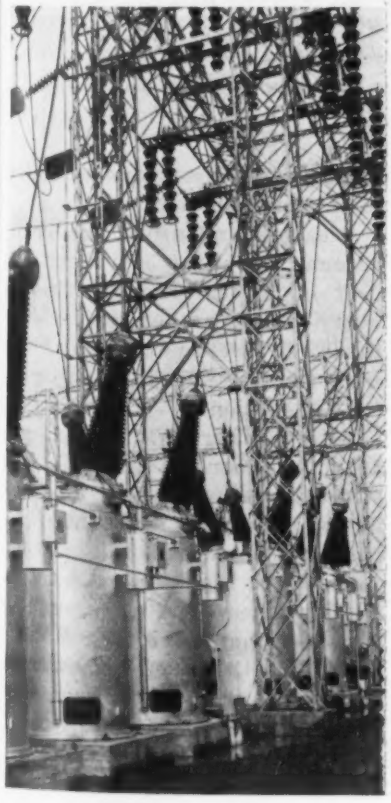
# WEST: Peak Load on Circuit Breakers

**High voltage circuit breaker called on for more duty in the West . . . Firms have 2 and 3 year backlogs . . . Blueprint more power for West . . . Heavy metal use—*By T. M. Rohan.***

Drawing power through thousands of miles of wire strung from distant mountain powerhouses, western cities and their industry have made development of the high voltage circuit breaker a focal point in the West.

Western circuit breaker manufacturers needed no prompting to expand. Supplying heavy power switching equipment to utilities and industry for interruption of 330,000 volts (330 kv) and higher, these firms are working on backlogs that are 2 and 3 years long.

Meanwhile 30 pct of new power installations through 1955 are being blueprinted for the general western area. Many more of the large cylindrical tanks with "horns" will stand guard outside powerhouses serving as safety valves for short circuits, overloads of power and operating trouble. They are the massive granddaddies of the familiar household circuit breaker rapidly replacing the fuse.



SACRAMENTO circuit breakers are lined up like sentries to handle juice overloads and short circuits.

### Competes with Goliaths

National heavyweights in the circuit breaker field are Westinghouse, General Electric and Allis-Chalmers. The first two produce mainly in the East. Westinghouse has a plant at Sunnyvale, Calif., building $2 million annually in all but the largest 230 kv size breaker.

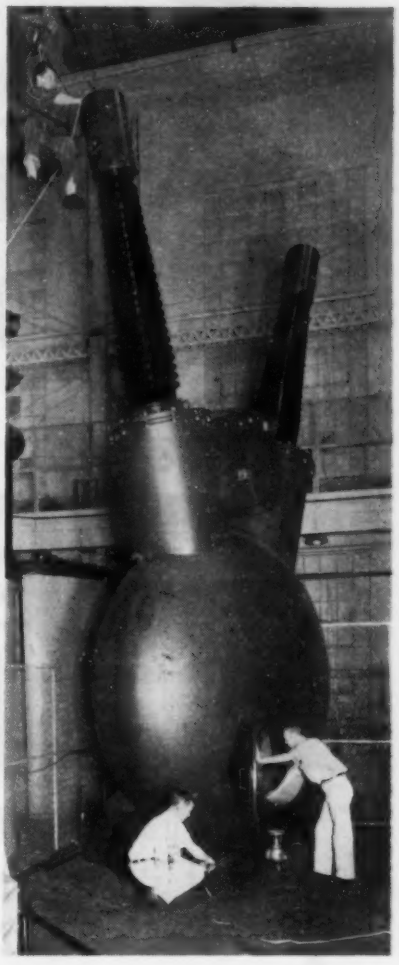
A David among the electrical Goliaths is Pacific Electric Mfg. Co., San Francisco — which has four plants and outsells GE and Westinghouse in the West, competes with them elsewhere. Pacific Electric specializes in spring-closing breakers as against the hydraulic, compressed air and solenoid types made by others. Kelman Mfg. Co., of Los Angeles, also shares the western market.

### Heavyweight in Metal

High voltage (7.2 kv and up) outdoor power switching equipment is generally classified as circuit breakers, load break switches, and air switches or disconnects. Breakers automatically interrupt current in ⅛ to 1/20th sec when a short circuit occurs. And sometimes the short pushes the normal current load up 20 times. A powerful oil spray extinguishes the arc.

Allied but smaller equipment are load break switches for opening circuits at over normal current (not much over) and air switches or disconnects for opening non-energized circuits.

High voltage three tank circuit breakers weigh in at about 17 tons empty and are made mostly of copper, steel, aluminum and porcelain. Outer tanks are made of ½ in. steel plate, capped with a spun steel "boiler head." About 6 tons of steel castings, alloy steel, copper and aluminum go into the breakers and another 6 tons is in porcelain entrance bushings containing copper lead-in wires.



OIL CIRCUIT breaker is being constructed at General Electric's Philadelphia plant. It's one of 15 which will be the first to have a high interrupting rate of 15 million kva.

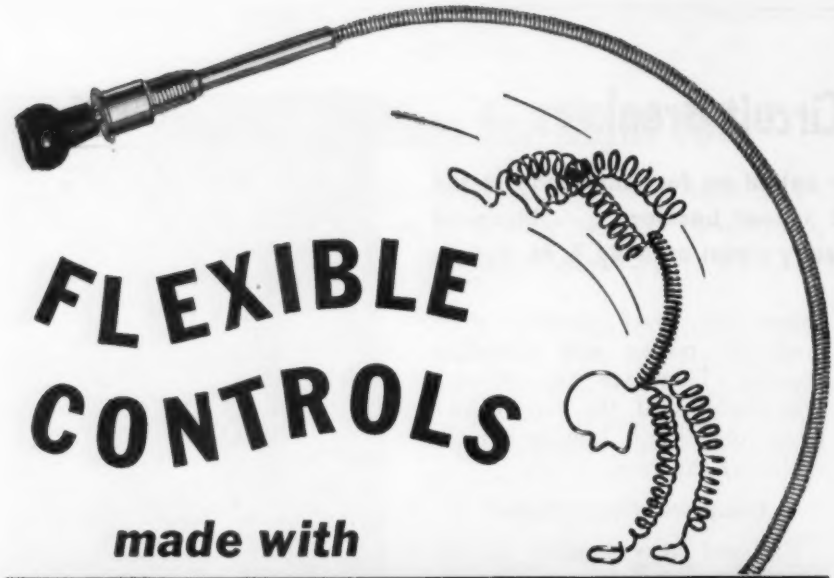
### Need Steel Towers

As if that were not enough metal for this equipment to use, each breaker needs about 20 tons of steel and copper for equipment.

Western circuit breaker and switching equipment makers use an annual 35,000 tons of iron and steel, 6000 tons of copper, aluminum, and special metals—plus the tonnage that comes into the West as equipment made in the East.

A single utility such as Pacific Gas & Electric Co. of California uses a yearly 20,000 tons of steel

*Turn Page*



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—Management—

# SMALL FIRMS: Hav ough

**AIM tells how to better small company . . . Cut debt . . . Spend more on research, sales.**

Considering operating difficulties and other obstacles that beset the small business, it is proportionately more difficult to run a small firm than a large one. Such is the contention of American Institute of Management based on a special study, "The Improvement of Small Business Management."

### Turn On Frown

Bankers who are all smiles when dealing with a big businessman turn on a frown when the smaller executive walks in. Creditors are inclined to ask for their money with no sign of leniency. With big companies throwing their weight and prestige around, small firms find it harder to get and hold executives and workers.

Nor can small business find it in its heart or pocketbook to invest heavily in such big business practices as research, develop-

—Power—

*Continued*

transmission towers and 20 million lb of aluminum wire.

Breakers and allied equipment account for about 5 to 7 pct the cost of a powerhouse. This is heavy spending when you consider that U. S. Steel's new mill at Pittsburg, Calif., is building a unit costing $80 million.

Voltages carried by power lines are on the increase and while this means power savings it also has imposed the need for greater circuit breaker dependability.

America's highest voltage transmission line (287 kv) in regular service in the U. S. is from Hoover Dam to Los Angeles. Bonneville is also going over 300 kv soon and the American Gas & Electric Co. also has a short transmission line of 330 kv. The Atomic Energy Commission's new plant near Paducah, Ky., will have a 300 kv line. The future of breakers is loaded.

## ...tougher Problems

ment, cost accounting, depreciation and equipment policy. These add other competitive disadvantages to pin it down.

Yet somehow the small businessman tussles with his larger brethren successfully. It must mean that he's a smart cookie—but if he wants to stay smart he must be alert in the task of improving management.

The Institute warns the small businessman to avoid being a one man managerial show.

Because the smaller firm is often pinched for funds it should not accumulate excess inventory. Attempting to maximize earnings through use of borrowed funds is another error small business should dodge. If the small man unwisely increases short term debt, or assumes funded debt to make sales and earnings grow, he may see his business going to banks and creditors if business tapers off.

A slower rate of growth based on reinvestment of retained earnings is better than the risk-taking type of growth springing from use of borrowed cash. Base every addition to plant and equipment on a calculated rate of profit on that investment under normal circumstances.

### Try More Research

There is also a tendency in small firms toward inadequate provision for depreciation. Small companies may count too heavily on maintenance and they tend to believe that even old equipment can do the job on hand. This restrains growth and doesn't encourage cost cutting.

The Institute urges small plants to devote more time and money on research and development. At least 2 pct of annual gross revenues should be for research. Responsibility for research planning should be placed on one executive.

Small companies have a tendency to expect salesmen to come home with the bacon without sufficient training.


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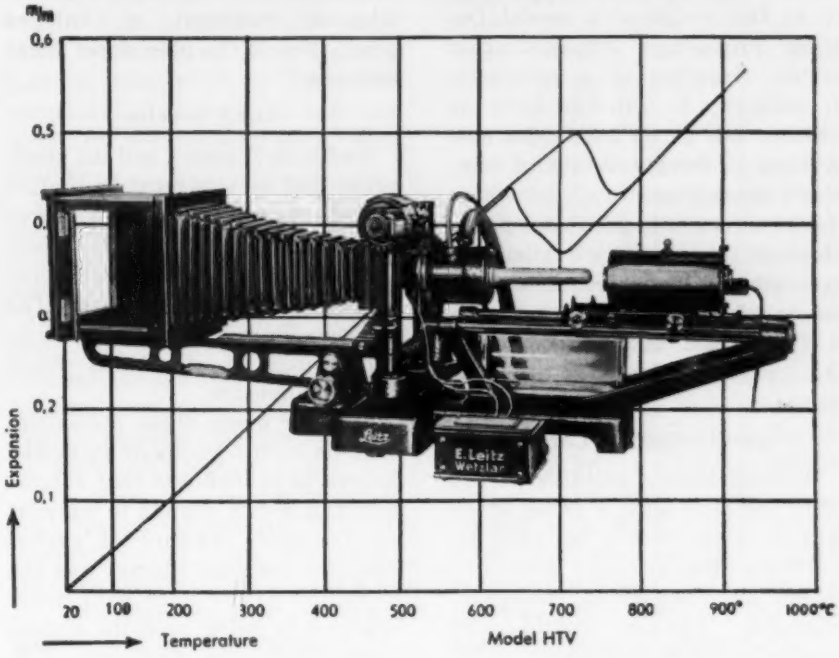


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# TRUCKS: Will They Ride The Rails?

**Van-Car Corp. gets tax writeoff for special flat cars to haul truck trailers . . . Could cut costs, soften truck-rail rivalry . . . But problems must be solved—*By K. W. Bennett.***

Cease fire in the traditional rivalry between truckers and railroaders may be several steps nearer as the result of a recent Defense Production Administration action. Granting of a certificate of necessity to Van-Car Corp. of Chicago has given both sides new interest in the possibility of combined operations.

Van-Car stoutly advocates movement of loaded truck trailers by specially built flat cars between points of heavy rail-truck traffic. A 70-pct fast tax writeoff gives the company a chance to prove its point.

### Build Special Cars

Writeoff covers building of 500 70-ft flat cars with a value of $6 million. Cars would be built by Pullman Standard Car Mfg. Co., leased by Van-Car to interested railroads. Van-Car would also handle terminal operations at individual railheads rather than have the roads build centralized truck-rail terminals.

Truckers are interested. A number have said they will have shipments ready as soon as Van-Car units can roll. Four major railroads have approved the idea, and several smaller roads are downright eager to get going.

### Not All Solved

But the roads point out there are still problems to be solved:

1. Such service would mean adding special cars. Would increased traffic justify the expense, or would combined operations cut into present rail freight, idling regular cars?

2. Previous, limited tests of the plan have not been proved very successful.

3. Truckers and railroad men have had trouble working out fair rail rates for such service.

4. Railroads have established delicate freight balances based on return of empty cars and outbound shipment of raw materials versus inbound transport of finished goods. Would the plan upset these balances?

### Limit Service

And both truckers and the roads agree that service must be limited to runs between points of heavy interchange, as Chicago-St. Louis, Chicago-Detroit, Chicago-Minneapolis, Chicago-New York. The Chicago-Detroit run is the economic limit. Shorter hauls would be too expensive.

Van-Car meets these difficulties head-on with a volley of facts and figures. It is confident that volume would be heavy enough to warrant special cars. Failure of earlier tests, the company claims, was due to failure to use such equipment. Where it is being used the system works, profitably. And even without special cars there have been exceptions which are outstandingly successful. New York, New Haven & Hartford R.R. has had particularly good results, is currently expanding operations.

Van-Car believes that truckers and the roads can now work out a satisfactory rail rate. It estimates highway trucking costs at 25¢-30¢ per mile, believes rail shipment would cut them to 20¢. Shippers would pay truck rates.

Freight cars are returned empty on some runs, but freight-truck service would be used only where there is good (up to 85 pct of capacity) 2-way truck traffic anyway. And, the company feels, less than carload lots would cost roads less under the combined system.

No railroad has indicated an immediate jump. The Pennsylvania has been mentioned in connection with the program, but refuses comment. At least one midwestern road has a plan of its own. Van-Car has a $6 million certificate and has been working quietly toward this end for 5 years, but railroads must be fully sold, terminal facilities installed, and special cars delivered. Mr. Shipper is not holding his breath.

## Develop New Standardized Car

Pullman Standard Car Mfg. Co. is getting ready for production of a new standardized freight car. The company expects to be turning out the all-welded, 70-ton, covered-hopper car on a mass production basis by the third quarter.

Designated as the PS-2, the new car is a successor to Pullman-Standard's first standardized car introduced in 1947. Company reports more than 50,000 of the earlier model cars have been delivered or are on order, accounting for 30 pct of all box cars ordered in the postwar period.

### Lab Test Prototype

A prototype of the new covered-hopper car has already been tested at Pullman Standard's Research & Development Laboratories, Hammond, Ind.

Standardization of design makes it possible to manufacture the PS-2 on a mass production basis. Features of the new car include: All-welded construction, which eliminates pockets and ledges, making fast clearing and cleaning possible; circular weather-tight hatches; self-clearing hopper chutes.

# PRICES: More Items Shed Shackles

**Price controllers may hold on to ceilings on steel and pig iron as long as possible . . . OPS frees building materials, some machinery items, metal products—By *R. M. Stroupe.***

Citing the close tie-in between steelmaking and production of materials for national defense, price controllers are showing they want to hang on to ceilings on pig iron and steel mill products.

How much longer the lid will stay on, over the protests of producers, was debatable as Office of Price Stabilization used General Overriding Reg. 44 on Mar. 12 to cut adrift all building materials, a considerable number of machinery items, and some metal products. The same order freed No. 2 heating oil, grocery and stock feed items, and all chemicals except sulfur, sulfuric acid, sulfur trioxide, and oleum.

*OPS Lifted All Price Controls on Mar. 17. See P. 72.*

Machinery items appearing in GOR 44 bring producers $12.5 billion in sales each year, OPS says. Included in the list are engines and turbines, pumps and compressors, gaskets, dies, mechanical power transmission equipment, jigs and fixtures, electrical lighting equipment, and abrasive products.

Producers' sales of iron and steel products named in GOR 44 are estimated at $690 million annually. Among the goods in this category are standard line power boilers, smoke stacks, and metal doors, sash, frames, molding, and trim.

OPS calculates that producers get $4.7 billion annually for the kinds of building materials decontrolled last week. Sheet metal building products, hot water heaters, food waste disposers, industrial and commercial refrigerators and air conditioners, and cast iron soil pipe were important elements in this group.

Principal commodities which GOR 44 failed to decontrol, with the OPS estimate of producers' annual sales figures: steel mill products, $9.6 billion; pig iron, $425 million; machine tools and accessories, $1.3 billion; metal cans, $1.26 billion; steel shipping containers, $200 million; fabricated structural steel, $1.9 billion; and concrete reinforcing bars, $195 million.

In addition, there are ferroalloys, including tungsten, manganese, and chromium, $800 million; beryllium master alloys, oxide, and alloy mill products, $1 million; nickel, Monel, and Inconel primary shapes and mill products, $150 million; molybdenum, $5 million; tantalum, $500,000; and columbium, $500,000.

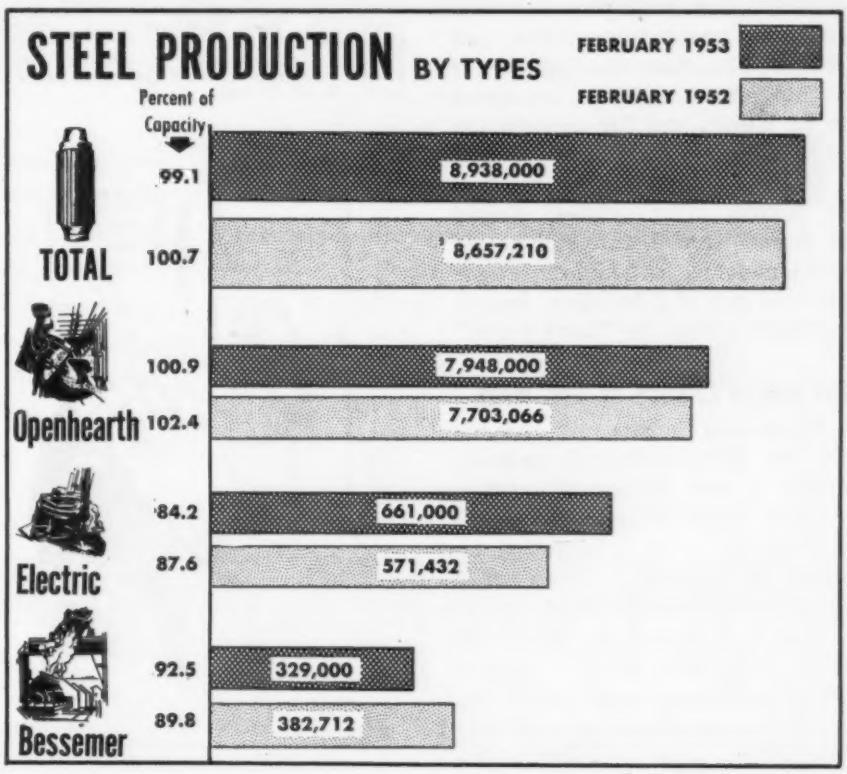
The sixth in a series of large-scale decontrol actions, GOR 44 removed curbs from fabricating services involving structural steel and miscellaneous iron and vessel shop products for field assembly. All formerly regulated by OPS they are free of controls. Likewise export and import sales are unrestricted on decontrolled goods.

As the price control structure continues to fall apart, federal officials are admitting they have no idea what will happen to prices in general when OPS closes its doors on Apr. 30. Most agree that what happens to steel prices will influence determining costs of finished products, particularly those needed by the military.

### Rise for Steel?

There's some opinion in government that prices will go up on a number of steel items this year. Another view is that the prices of steel and steel products will show a general advance, but not for some time after decontrol.

Over-all price increases to consumers, according to Washington estimates, already are approaching the $1 billion mark. In appraising this calculation, though, it should be noted that OPS has no solid statistics on price trends since major decontrol actions were started. Also for some products the trend may be down.



## DEFENSE:

**Air Force leads January military spending with $10.1 billion.**

Air Force was entering into procurement obligations for major construction and equipment at a slightly slower rate than Army and Navy, respectively, during January, most recent statistics from the Defense Dept. show.

Despite the January figures, indicating that Army and Navy obligated $800 million each while Air Force accounted for $700 million during the month, the last-named department's obligations for the first 7 months of this fiscal year were more than twice the combined amounts for Army and Navy. Totals for the July 1952-January 1953 period were $10.1 billion for Air Force, $4.9 billion for Army, and $4.9 billion for Navy.

These sums represent obligations for military construction, plant expansion, and supplies and equipment. Contracts for these purposes have been placed with both private firms and military-operated plants.

In the recent 7-month period, the armed forces obligated $16.4 billion for such fighting hardware as ships, ammunition, tanks, and planes. The 3-service figures for clothing, food, and fuel amounted to $2 billion, and for construction $1.5 billion.

Over-all obligations for the first 31 months after fighting started in Korea were $142.5 billion. Of this amount, $100.4 billion was for procurement and building, including $84.2 billion for "hard goods."

## Get Better Chance at AEC Work

Operations offices of Atomic Energy Commission will provide, under a new agreement worked out with Small Defense Plants Administration, new information on procurement opportunities deemed suitable for small business.

This activity will be part of a joint AEC-SDPA program that is expected to assist small companies in getting more contracts related to nuclear energy operations. An important element of the plan is the anticipated cooperation between AEC and SDPA offices in the field.

SDPA regional offices will suggest qualified small firms which are prepared to handle proposed procurements. In addition, they will provide AEC personnel with information on other SDPA programs, including financial assistance and management and technical aid to small business.

## Contracts Reported Last Week

Including description, quantity, dollar values, contractor and address. Italics indicate small business representatives.

Switch knife, 500, $125,850, Powercraft Corp., St. Louis.

Drive & motor assy, 62 ea, $61,194, Sperry Gyroscope Co., Great Neck, N. Y., *George A. Dennis.*

Auxiliary power plant, 362 ea, $504,860, Waukesha Motor Co., Waukesha, Wis.

Parts for F4U aircraft, var, $63,962, United Aircraft Corp., Dallas, *William H. Haugh.*

Indicator thermometer, var, $75,900, The Lewis Engr. Co., Naugatuck, Conn.

Spare parts for J57-P-9 Engines, var, $1,961,080, United Aircraft Corp., East Hartford, Conn., *E. E. Champion.*

Items for R4360 P & W engines MIPR R51-86N, var, $89,151, United Aircraft Corp., East Hartford, Conn., *E. E. Champion.*

Maintenance parts for J40-WE22, var, $335,303, Westinghouse Electric Corp., Philadelphia, *W. C. Wilson.*

Spare parts for J57-P-9 engines, var, $3,552,452, United Aircraft Corp., East Hartford, Conn., *E. E. Champion.*

Gasket, bolt, bracket assy, var, $3,896,749, United Aircraft Corp., East Hartford, Conn., *E. E. Champion.*

Deflector assy, var, $50,193, United Aircraft Corp., East Hartford, Conn., *E. E. Champion.*

Maintenance parts for Ad aircraft, var, $64,449, Douglas Aircraft Co., El Segundo, Calif., *W. H. Hough.*

"He's working on a phantom tool order for the Army."

Indicator, thermometer, var, $149,927, Lewis Engr. Co., Naugatuck, Conn.

Metal parts for booster, 13500 units, $1,240,640, Detroit Brass & Malleable Works, Detroit.

Replenishment of hardware, 25200, $73,850, Ray Whyte Electric Products Co., East Detroit, Mich.

Trucks, industrial crane, 9, $79,549, Silent Hoist & Crane Co., Inc., Brooklyn.

Tool sets, 800, $154,248, Century Tool Co., Gloucester, N. J.

Shell, chemical, 105 MM, 154000 ea, $1,227,380, York-Shipley, Inc., York, Pa.

Shell, HE, 443000 ea, $3,080,887, L. A. Young Spring & Wire, Trenton.

Shell, HE, 67500, $2,317,443, America Car & Dry Co., New York.

Tank, 90 MM gun, T48, 693105 ea, $377,580, Chrysler Corp., Detroit.

Concurrent spare parts, T-48, 7 sets, $43,654,660, Chrysler Corp., Detroit.

Fuel flowmeter indicators, 234, $124,739, Bendix Aviation Corp., Teterboro, N. J.

Compass adapter racks, 500, $981,500, The Magnavox Co., Ft. Wayne, Ind.

Tachometer indicators, 1037, $106,734, General Electric Co., Schenectady, N. Y.

Gyro Horizon indicators, 1137, $893,258, Bendix Aviation Corp., Teterboro, N. J.

Combination bomb rack & rocket launcher, 10070, $1,226,980, Tycoon Tackle Inc., Miami Spring, Fla.

Electric direct ranking statters, 1490, $473,447, Bendix Aviation Corp., Teterboro, N. J.

Valves, angle type, 198 ea, $110,980 Atwood & Morrill Co., Salem, Mass, *Robert O'Neil, Ellsworth Mansell.*

Delay, initiator, M14, 4500 ea, $116,685, Red Arrow Electronics, Orange, N. J.

Turret panel control boxes, 600, $60,558, The Sight Light Corp., Deep River, Conn.

Repair parts for inter-communication equipment, 3785, $71,807, Pitometer Log Corp., New York.

Cartridge, practice, 30 MM, 650000 rounds, $204,850, Western Cartridge Co., East Alton, Ill.

Cartridge, tracer, Cal. .30, 17300000 rounds, $1,626,874, Western Cartridge Co., East Alton, Ill.

Shell, HE, M71, 90 MM, 392000, $2,940,000, Murray Co. of Texas, Dallas.

Cartridge, ball, carbine, cal. .30, 66500000, $1,435,536, Western Cartridge Co., East Alton, Ill.

Gun sights, 3842 ea, $379,771, Gilbert & Barker Mfg. Co., West Springfield, Mass.

Compressor, 12, $216,900, Ingersoll-Rand Co., Washington.

Spare propeller shaft assy, 10, $207,500, Oakland Mach. Works, Oakland, Calif.

Conveyor, roller gravity, 900 ea, $63,108, Harry J. Ferguson Co., Jenkintown, Pa.

Valve assy, misc. 38 items, $402,154, Bendix Aviation Corp., South Bend, Ind., *G. I. Lyman.*

Pumps, misc. 5 items, $130,275, Bendix Aviation Corp., South Bend, Ind., *G. I. Lyman.*

Plugs, washers, screws, var, 111 items, $182,871, Bendix Aviation Corp., Sidney, N. Y.

Spacers, sockets, pins, var, 222 items, $339,365, Bendix Aviation Corp., Sidney, N. Y.

# Construction

## Steel Awards and Inquiries

**Fabricated steel inquiries this week include the following:**

**119 Tons,** Union, Conn., reinforced concrete pavement and 165.5 square span rolled beam bridge on Eastbound roadway of Wilbur Cross Highway, Rt. 15 including north and south service roads at Rt. 198. E. B. Burdick, Hartford, Conn., district engineer.

**Reinforcing bar awards this week include the following:**

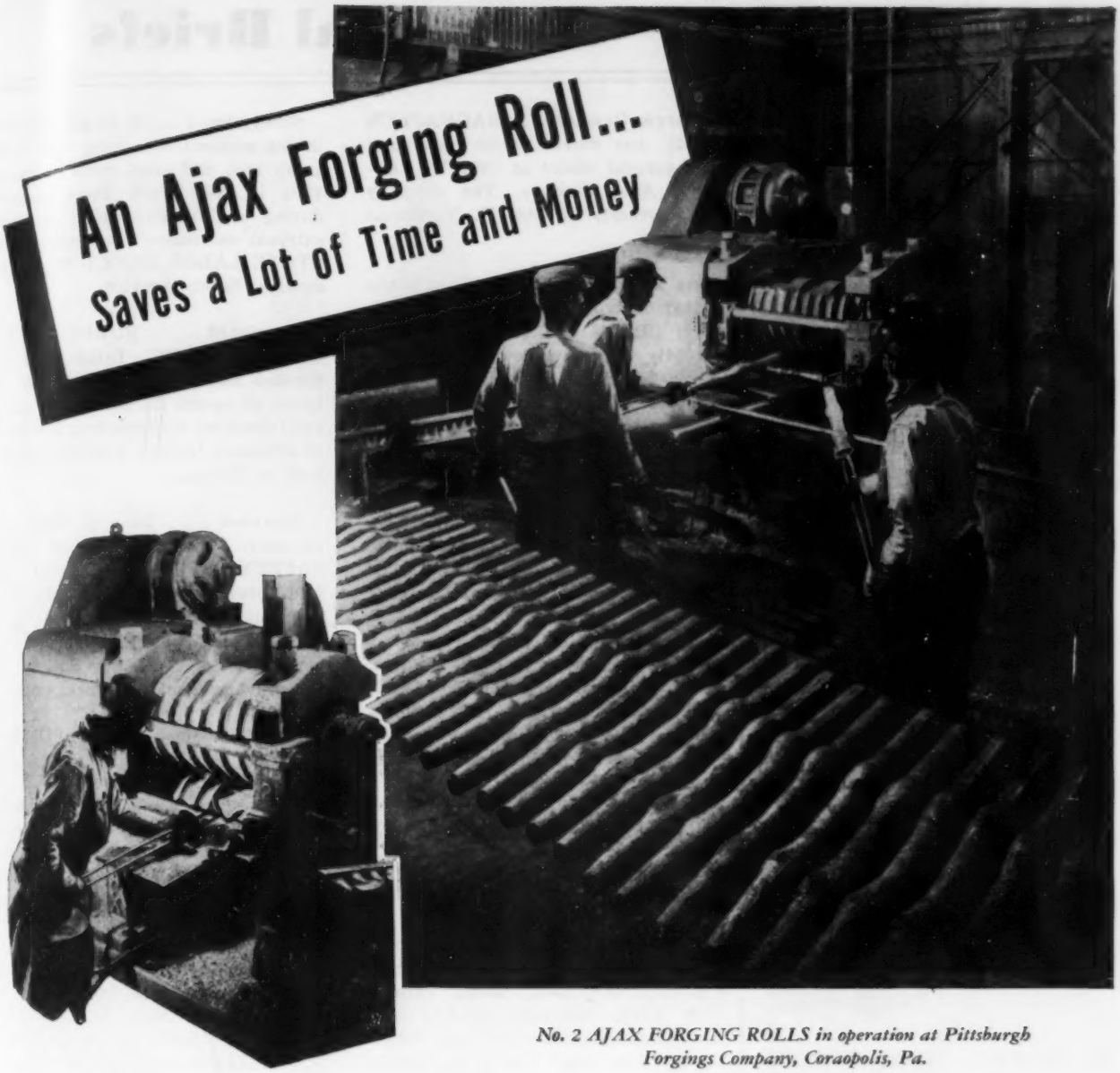
**464 Tons,** La Croix River, bridge Wisconsin-Minnesota to 74/1/, to Lakeside Bridge and Iron & Steel Co.

**290 Tons,** Great Lakes, Ill., Naval Warehouse to Corbetta Construction Co.

**Reinforcing bar inquiries this week include the following:**

**127 Tons,** Wilton and Redding, Conn., bridge to be constructed has overall skew span of 111.84 ft and is located over New Haven RR tracks. E. S. Lawler, New Milford, Conn., district engineer.

# An Ajax Forging Roll...
## Saves a Lot of Time and Money



*No. 2 AJAX FORGING ROLLS in operation at Pittsburgh Forgings Company, Coraopolis, Pa.*

The fast, simple operation of pre-rolling forging blanks in an AJAX Forging Roll greatly facilitates subsequent impression die forging. Wherever a reduced straight or tapered section is required on a blank of large cross section or where the drawing of a slender shank is required on pieces that have been previously forged, the AJAX Roll can do the work many times faster than the fastest swagers or hammers. In addition to the advantage of greatly increased forging production is the improvement in the quality. The metal is well distributed to accurately fill the die impressions, with minimum flash, and increased strength results from the improvement in grain flow. The choice of sizes in AJAX Forging Rolls and the wide adjustment feature of the Rolls makes it possible to install just the right roll to meet your needs and at the same time increase the range of your production forging equipment.

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# Industrial Briefs

**Larger Quarters . . .** MAGNAFLUX CORP. has moved to its new plant and general offices at 7300 W. Lawrence Ave., Chicago. The company was formerly at 5900 N. Northwest Highway.

**At Your Service . . .** Wilson Mechanical Instrument Div. of AMERICAN CHAIN & CABLE CO., INC., recently opened a new service shop at 20455 Sherwood, Detroit, with complete facilties and factory trained personnel for servicing and repairing "Rockwell" and Tukon Hardness Testers.

**Now In Command . . .** Major Gen. Kenneth E. Webber has assumed command of the EASTERN AIR PROCUREMENT DISTRICT, New York.

**Touring Europe . . .** C. O. Burgess, Technical Director, GRAY IRON FOUNDERS' SOCIETY, INC., Cleveland, left recently for Europe to study research methods in Great Britain, France and Switzerland.

**Guided Missiles . . .** NORTHROP AIRCRAFT, INC., Hawthorne, Calif., has received U. S. Air Force orders for the production of a quantity of guided missiles.

**New Dept. . . .** NORTH AMERICAN PHILIPS CO., INC., Mount Vernon, New York, has established a new Non-Destructive Testing Dept., headed by Alexander Gobus, to handle new research developments in the industrial X-ray field.

**Top This . . .** GULF OIL CORP., has placed in operation what is believed to be the world's largest ethylene unit at Port Arthur, Texas. The plant will produce 2½ billion cu ft of ethylene gas annually.

**Contract Awarded . . .** EKCO PRODUCTS CO., has been awarded a new Army ordnance contract totaling approximately $3,500,000 for the manufacture of steel artillery shell cases. Deliveries will begin about Apr. 1 from Ekco's Massillon, O., plant.

**Increase Capacity . . .** WHEELING STEEL CORP. reports that concentration of steelmaking operations at the Steubenville Works will increase the steel ingot capacity to approximately 2,010,000 tons per year.

**Safety Pays . . .** A 38-pct reduction in the accident frequency rate in the scrap iron and steel industry during 1952 in New York State occurred during an intensive safety and educational campaign conducted by the STATE LABOR DEPT.'s Div. of Industrial Safety Service.

**Appointed . . .** SURFACE COMBUSTION CORP., Toledo, has appointed Economy Equipment Co., St. Louis, as agents for the sale of standard industrial equipment in the states of Missouri, Kansas, and the southern half of Illinois.

**Awarded . . .** John T. Ryan, Jr., executive vice-president, of MINE SAFETY APPLIANCES CO. has been presented the Duquesne Management Award for "leadership in management," by the Duquesne University chapter of the Society for the Advancement of Management.

**New Company . . .** H. A. PIETSCH CO., 894 Heckler Drive, Pittsburgh, has just been organized by H. A. Pietsch. The company will handle engineering and sales of equipment for commercial and industrial heating, air conditioning, processing and combustion in the area of western Pennsylvania, Eastern Ohio and West Va.

**We're Neighbors . . .** NATIONAL GYPSUM CO., has transferred its Export Sales Dept. to New York City. The department, to be located at 420 Lexington Ave., is expected to be in full operation by Apr. 1.

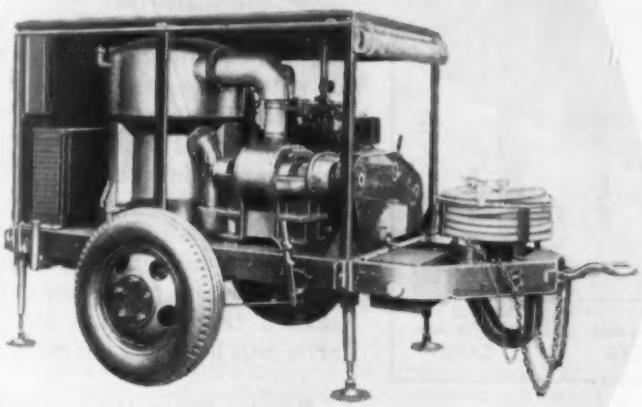
**Enters Field . . .** IRON FIREMAN MFG. CO., Cleveland, has entered into the central cooling unit field.

**Exclusive Basis . . .** HOMESTRAND, INC., Larchmont, N. Y., has appointed Empire Tooling Assn., Birmingham, Mich., as exclusive representative in the state of Michigan.

**Sales Increase . . .** UNITED ENGINEERING & FOUNDRY CO., Pittsburgh, reports an increase in net sales of 26.3 pct over last year.

**Safety First . . .** AIRESEARCH MFG. CO., Los Angeles, established two safety records during 1952. The aircraft accessory plant was cited by the National Safety Council as the safest aircraft plant in the West and the second most accident free in the country.

# FRESH WATER FROM THE SEA ...?



Portable Diesel-driven sea-water compression still, producing 85 gallons of pure water per hour. Made by Cleaver-Brooks Company, Special Products Division, Waukesha, Wis., which also makes stationary installations for chemical, paper, pharmaceutical and similar plants, for production of pure water or recovery of valuable by-products.

## USE REVERE METALS!

This is a portable compression still, which produces pure distilled water from the sea at the rate of 85 gallons per hour. It is made by Cleaver-Brooks Company, Special Products Division, Waukesha, Wis., an important producer of stills, either portable or stationary, for the Armed Forces and for industry. An important feature of Cleaver-Brooks design is the selection of metals in accordance with the water conditions to be met, whether salt, brackish, contaminated, or requiring recovery of valuable by-products. Thus, for example, the heat exchanger, of the tube-within-a-tube type may have cupro-nickel tubes and headers, or Admiralty tubes, naval brass, silicon bronze, according to the nature of the service. Such care in selection of metals is in part at least responsible for the high reputation Cleaver-Brooks enjoys.

In addition to supplying Revere Metals, we were also requested to collaborate with engineers and production men on fabrication methods, including forming, brazing, welding and annealing. Cleaver-Brooks is a large and well-staffed company, and its experience is such that it is capable of conducting its operations unassisted. However, like so many companies, it likes to have others double-check its conclusions and methods, to protect itself and its customers. The Revere Technical Advisory Staff was glad to respond to the call.

Such work is typical of the collaboration Revere offers to you through its salesmen, its Technical Advisors, and the Research Department. Remember, we do not take the place of your own engineers, designers and production people; we consult with them, and make our knowledge freely available, on a confidential basis, of course. Call the nearest Revere Sales Office. Consult your telephone book or write direct.

**REVERE**

**COPPER AND BRASS INCORPORATED**

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*Mills: Baltimore, Md.; Chicago and Clinton, Ill.; Detroit, Mich.; Los Angeles and Riverside, Calif.; New Bedford, Mass.; Rome, N. Y.— Sales Offices in Principal Cities, Distributors Everywhere*

**SEE REVERE'S "MEET THE PRESS" ON NBC TELEVISION EVERY SUNDAY**

# Tungsten-Carbides Speed Car Output

**Essential to transfer machines, automated factories . . . Use started in 1929, brought faster output, lowered costs . . . Let designers use stronger materials—By *R. D. Raddant.***

Highly publicized "push button" operation of modern engine lines has become the accepted thing in the auto industry. Each new engine in the past few years has been the result of increased automation with resulting lower costs and faster production rates.

Obscured within the tunnel broaches and milling machines are the parts that really make them possible — the tungsten-carbide tools that do the work.

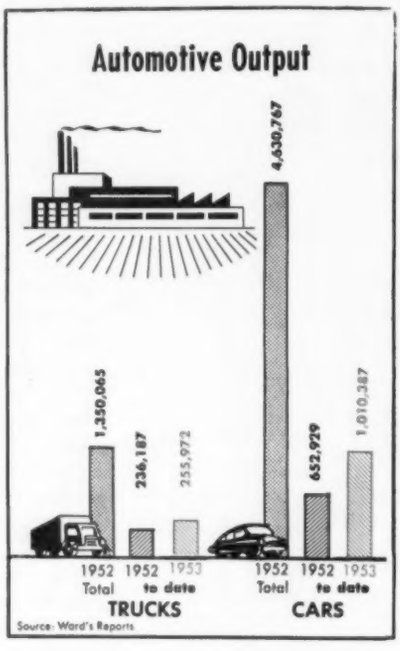
**Keep Costs Down** . . . Some authorities say that without carbides, transfer machines would be impossible. A corollary statement is that without carbides, the present-day car might possibly cost twice as much as it does.

It was only in 1929 that a salesman from Carboloy, then a subsidiary and now a department of General Electric, made his first sale to a Detroit auto plant—a tool to turn a cast iron fly wheel. But it was still some years before they were able to make much headway in the industry. Improvements had to be made in the tools themselves as well as the job of selling the industry on the then comparatively new tool material.

**Speeds the Work** . . . Carbides trebled the speed of milling cutters, from about 45 fpm for high speed steel to the present-day rate of 150 fpm for a carbide tool. Use of perhaps more than 100 tungsten-carbide planer-type inserts in a tunnel broach makes it possible for an engine block to move at a rate of better than 150 fpm in a modern automotive engine plant transfer machine.

In addition to speeding up the rate of machining, use of carbides has made it possible to use much tougher material in today's cars. For example, motor blocks in today's cars are a tougher grade than the old gray iron blocks.

It's easy to understand why modern transfer machines would be impossible without carbide tools. Speed needed to make them economically sound would be impossible, downtime prohibitive.




**Sold by Figures** . . . Vernon H. Dearle, manager of the Michigan sales district for Carboloy, pioneered carbides in the industry. Here are some actual figures from a study he made about 1935 that resulted in the permanent introduction of carbides to a major auto plant. The comparison was made with a cast iron alloy that ranked between high speed steel and carbide in effectiveness.

Grinding costs for the life of one carbide tool were $2.40 compared with $120 for the other material. A carbide tool required one grinding for 2500 pieces compared with 50 for the competitor. Total savings were $119.

**Copper Danger Passed** . . . The industry now appears to have safely passed the danger point of a serious copper shortage this year, at one time considered to be the weakest spot in automotive materials procurement.

A combination of relaxing import restrictions plus recent decontrol of copper prices have combined to ease copper supply. A cross section of the industry, contacted last week, revealed no serious concern over copper supply, but some apprehension on price.

Little copper comes directly to the industry except in wiring, some small platings and in the copper content of radiators. Wiring and radiators contain the bulk of automotive copper.

There is a general agreement that decontrol of price will pull more copper into the market from marginal operators. There has been so little success at developing copper substitutes, particularly in radiators, that there is little chance that even the increased price will help supplies much.

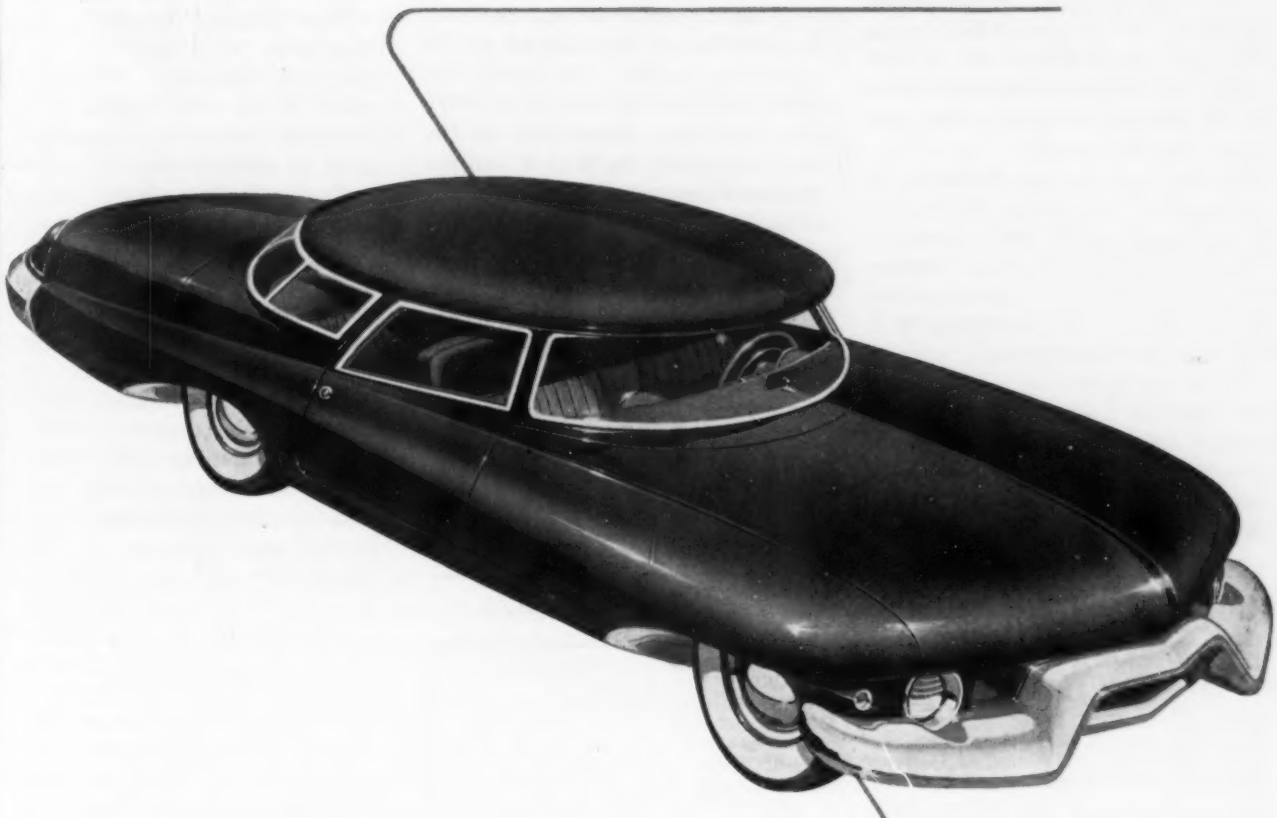
**Reports Favorable** . . . Field reports on the 12-v electrical systems offered on several of the new 1953 cars indicate favorable results, according to H. N. Metzel, chief engineer of Oldsmobile Div. of General Motors.

Oldsmobile, as well as Buick, Cadillac, and Chrysler replaced 6-v systems this year, principally to satisfy the requirements of high compression engines.

Mr. Metzel reports that the results in areas where steep hills and long grades are customary more than justified the decision. Improved cold weather starting was another favorable result. In-

Specify N-A-X HIGH-TENSILE STEEL

# for Lighter Weight Longer Life with Economy



N-A-X HIGH-TENSILE, having 50% greater strength than mild carbon steel, permits the use of thinner sections—resulting in lighter weight of products. It is a low-alloy steel—possessing much greater resistance to corrosion than mild carbon steel, with either painted or unpainted surfaces. Combined with this characteristic, it has high fatigue and toughness values at normal and sub-zero temperatures and the abrasion resistance of a medium high carbon steel—resulting in longer life of products.

N-A-X HIGH-TENSILE, with its higher physical properties, can be readily formed into the most difficult stamped shapes, and its response to welding, by any method, is excellent. Due to its inherently fine grain and higher hardness, it can be ground and polished to a high degree of lustre at lower cost than can mild carbon steel.

Your product can be made lighter in weight . . . to last longer . . . and in some cases be manufactured more economically, when made of N-A-X HIGH-TENSILE steel.

MAKE A TON OF SHEET STEEL GO FARTHER Specify N-A-X HIGH-TENSILE STEEL . . . And "MAKE YOUR PRODUCT LAST LONGER"

**GREAT LAKES STEEL CORPORATION**

N-A-X Alloy Division • Ecorse, Detroit 29, Michigan

NATIONAL STEEL CORPORATION

KEEP YOUR SCRAP MOVING TO YOUR DEALER

troduction of the higher voltage system was pointed at more than present needs, however. When current octane ratings of fuel go higher, the system will meet demands for adequate voltage, Mr. Metzel pointed out.

## SALES:

**Hudson's Jet follows industry's trend to broader market base.**

The Jet, Hudson's long-awaited entry to the low priced field, made its appearance this week. It will enter this highly competitive field in an attempt to broaden the company's market base.

In pushing the Jet, Hudson will feature its low center of gravity, traditional with the company's "step-down" design. This feature is aimed at what is called big car roadability, or its ability to hold the road well on curves.

Powered by a super compression six cylinder L-head engine, it develops 104 to 110 hp and a compression ratio of 7.5 to 1. Cylinder block is a chrome-alloy, said to be the hardest in the industry. List prices range from $1685 to $1775.

Hudson's entry brings to seven the number of cars aimed at the low price bracket. The traditional Chevrolet-Ford-Plymouth triumvirate has been challenged by the Nash Rambler, the Willys, and the Kaiser-Frazer Henry J. But Chevrolet and Ford, by introducing more expensive lines, have also edged into the medium field.

Expansion of market base has been one of the characteristics of 1953 new car planning. Starting with Packard, which set up two distinct lines to grab a bigger share of the total business, there has been a widening of the line of almost every new car this year.

**Automotive Production**

*(U. S. and Canada Combined)*

| WEEK ENDING | CARS | TRUCKS | TOTAL |
|---|---|---|---|
| Mar. 14, 1953 | 134,776* | 32,057* | 166,833* |
| Mar. 7, 1953 | 128,511 | 30,314 | 158,825 |
| Mar. 8, 1952 | 92,141 | 28,251 | 120,392 |
| Mar. 1, 1952 | 88,166 | 26,960 | 115,126 |

*Estimated

Source: *Ward's Reports*

THE BULL OF THE WOODS — By J. R. Williams

WAIT A MINUTE-- YOU SAY THAT YOU SAW THE WHOLE THING?
WELL, NO-- NOT ALL! AH, I, UH... I HEARD A NOISE... THEN ANOTHER... THEN ANOTHER... THEN--THEN I LOOKED--
EVERYBODY'S AFRAID OF TH' LITTLE BLACK BOOK! BRAVE WINDBAGS SHUDDER AND COWER AND RUN WHEN IT COMES OUT!
YEH-- EVEN GANGSTERS ARE MORE AFRAID OF A PENCIL THAN OF A PISTOL!
3-20 J.R.WILLIAMS
THE SILENCER
Copr. 1953 by NEA Service, Inc. T. M. Reg. U. S. Pat. Off.

## Show Makes Strong Sales Pitch

The Chicago Automobile Show this week is entirely a sales display. Accordingly, visitors saw some of the finest products that could be dreamed up by each company to attract crowds.

Sandwiched between the new cars, both current and futuristic, were some engineering displays such as General Motors exhibits on research, engineering and styling and a Dodge audience-participation display on braking.

But exhibits were chiefly built around each company's most extravagant display cars. For example, Lincoln-Mercury had the XL-500, its latest experimental model, as well as six "dream cars," one of which has more than $4000 worth of gold plated brightwork.

GM showed its five futuristic sports cars, one from each automotive division. Packard displayed its new custom limousines and sedans as well as the Caribbean, its special sports car. Nash unveiled its new Nash-Healey-Le Mans hardtop.

These special cars are not just for display. The Chevrolet Corvette, the Nash-Healey and the Caribbean are all earmarked for production and other companies are ready to enter this special field.

## Ford Will Reopen Rouge Rotunda

The Ford Rotunda, one of Detroit's biggest tourist attractions and gateway to the Rouge plant, will be reopened about June 1 as part of Ford's 50th anniversary.

More than 5 million persons visited the Rotunda in Dearborn before World War II when its display areas were converted to office space. It was originally built for the Chicago World's Fair in 1934 and moved to Dearborn.

# Are Standby Controls A Dead Issue?

**Congressional opposition may block passage of any modified controls legislation . . . Ignore committee recommendations . . . White House may take cue from Congress—By G. H. Baker.**

Even if the Senate Banking Committee approves Sen. Homer E. Capehart's plan giving the President the right to freeze prices and wages for 90 days in emergency, political maneuvering may block its passage.

Sen. Capehart also has up before this Committee another plan establishing clear-cut standby controls. But even the Banking Committee may not approve this. At the hearings, business and industry will be testifying against any standby control powers.

**Fear Controls Abuse** . . . Long sickened by abuse of controls power and the philosophy of controls for controls' sake, industry is against standby controls in principle and fears them as a weapon in the hands of government agencies.

Of the 15 committee members only three have expressed their firm opposition to controls. Silence of the others and some private statements are being interpreted to mean that the 90-day freeze proposal will be approved.

What is prompting some Republicans to caution in unshackling the economy of controls entirely is their vulnerability to Democrat finger-pointing if a crisis comes and controls are needed quickly.

**Postponed to Death** . . . If a bill on controls evolves from committee hearings it will be roughly handled by Republican opposition in the Senate. Sen. Robert Taft although not on the committee may try to postpone the bill out of existence in the Senate.

Chairman Jesse P. Wolcott, R. Mich., of the House Banking Committee, takes the position that since the White House hasn't asked for controls hearings there will be none for the present.

**Jump to Conclusion** . . . Sen. Capehart went on record after leaving a recent White House conference that President Eisenhower would sign a controls bill if Congress passes one. Contrary to popular interpretation this does not mean that the President favors these controls. He has merely implied that he will abide by the will of Congress on this case.

But if Republican opposition to a controls bill scuttles it in the Senate and doesn't even consider it in the House, there will obviously be no legislation.

**Phony Catalog Job** . . . Pentagon foot-dragging in setting up a new military supply system has stirred wrath of a budget-conscious Congress. Capitol Hill had hopes that streamlined and unified military procurement methods would result in substantial budget savings.

"Mrs. Brown wants an invitation to the coronation."

Present cataloging job does not meet the requirements of the new procurement law, it is charged. House members say the food catalog is not a single catalog, and if the remaining 73 fields are handled the same way, a single catalog may never come into being.

Last summer, Congress told the Defense Dept. to get busy in the preparation of a combined shopping list of Army, Navy, and Air Force needs. A House Armed Services subcommittee claimed the Pentagon had frittered away about $50 million in funds and 5 years' time in a half-hearted attempt.

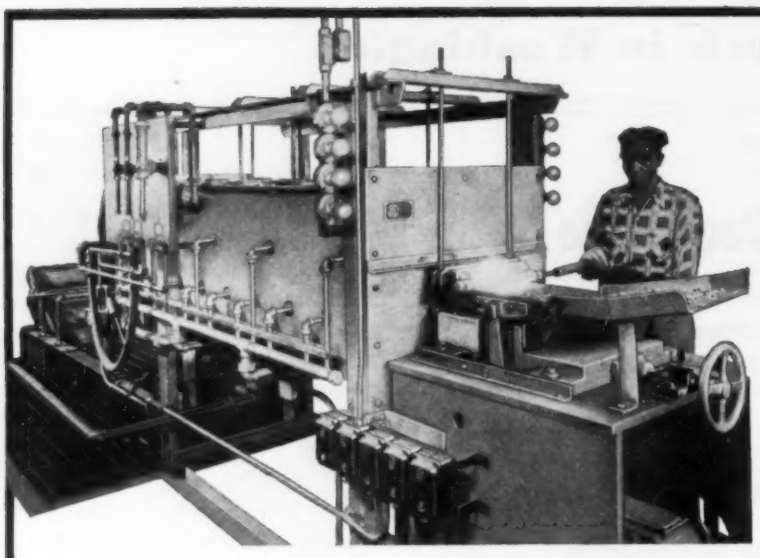
**Gets Industry Advisers** . . . President Eisenhower now stands to gain more industrial guidance on business and labor problems.

Seven prominent executives in management, labor, and education moved this week into six top government departments and agencies to give specialized suggestions on national defense problems.

Technically, the new advisers are listed as "consultants" to the National Security Council—a White House advisory group reflecting the policy views of the State and Defense Depts., the Atomic Energy Commission, and the Central Intelligence Agency.

**Orders Dip** . . . Latest figures from the Navy Dept. show small business wasn't doing quite as well, percentagewise, in the dollar value of purchase contracts received in late 1952 as in the corresponding period of 1951.

Office of Naval Materiel says between July 1 and Dec. 31 last year small busines received $628 million in orders, or 18.2 pct of the total placed by the Navy in this country. In contrast, firms in this category got 20.9 pct of the orders in the corresponding months of 1951.



*A.G.F. Model No. 166 Continuous Reciprocating Furnace and Automatic Quench Tank installation in the Chicago Screw Company plant at Bellwood, Illinois.*

# $10,000.00 saved annually by using AGF automatic continuous *"Ni-Carbing" EQUIPMENT IN Chicago Screw Co. plant Bellwood, Illinois

At the Chicago Screw Company, work such as screws, threaded fasteners, etc. is Ni-Carb* case hardened from a depth averaging .003″ to .005″ on relatively small pieces to a depth of .010″ on large pieces up to ⅜″ cross section. The use of an A.G.F. Reciprocating Furnace and the Ni-Carb* process saves Chicago Screw a net sum of $10,000 annually over other processing methods.

A.G.F. Reciprocating Furnaces with the full seal type muffle are completely modern production heat treating facilities with the attendant advantages of:

- *Low unit processing cost.*
- *Uniformity.* Each individual piece receives the same heat treatment and quench — not possible with dense basket loading in batch type furnaces.
- *Minimized maintenance.* All moving parts are located out of the heat.
- *Versatility.* All types of general and atmosphere work are handled in the same furnace without modification.
- *Ideal working conditions.* Messy salts with their attendant disadvantages are eliminated.

*Discharge end view of the in-line continuous type installation of Reciprocating Furnace and Quench Tank at the Chicago Screw Company.*

Write today for Bulletins 815 and 820 illustrating and describing the many features which enable A.G.F. Reciprocating Furnaces to lower your heat treating costs and improve the quality of your work.

* The Original Ammonia Gas Case Hardening Process developed by Mr. A. W. Machlet, Chairman of AGF.

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# LITTLE CMP: Victory for Industry

**All non-defense allocations of CMP metals will end June 30 . . . Tentative defense set-asides are 12 pct of steel, 20 pct of copper, 30 pct of aluminum—By *A. K. Rannells.***

Steel and aluminum industries have won a signal victory in their fight for clarification of control policy after June 30.

Two new orders were scheduled for issue this week which officials said should clear up the uncertainty that has been plaguing the steel, copper and aluminum industries.

These orders (Dir. 21 to CMP Reg. 1 and DMS Reg. 1) are to cancel all non-defense allocation authority as of June 30 and will establish the Defense Materials System as a "little CMP" to guarantee materials for defense programs.

Details of the two orders had not been completed early this week. But, officials said the general outlines and provisions had been agreed upon.

### Want Single Shift

Part of the delay is to allow National Production Authority time to revise any applicable CMP regulations to conform. It is felt that the change-over must be a single package deal.

NPA has amended NPA Reg. 2, the basic priorities regulation, with a view to stepping up scheduling operations.

As it now stands, after acceptance of a rated order the supplier and customer may get together and agree upon a delivery date which can be either earlier or later than set forth in the original order.

However, such changes in scheduling cannot interfere with shipment of any other rated order already accepted. Changes in program identifications of rated orders are not to affect position of such orders on shipping schedules.

This shift in controls will minimize the overlap of CMP and the new allocation system.

Roughly outlined, the steel, copper, and aluminum producers will be required to set aside specific percentages of their output for military and defense purposes. Remainder can be sold on the open market—first come, first served.

It was indicated that the tentative starting set-aside percentages would be in the neighborhood of 12 pct for steel, 20 pct for copper, and 30 pct for aluminum.

The new direction to CMP is to wipe out "all non-defense Controlled Materials allotment authority for the third and subsequent quarters," it is explained.

### CMP Holds Till July

Acting mobilizer Arthur Flemming emphasizes that, while allocation authority for civilian production is to end June 30, "CMP regulations remain in full force and effect through the second quarter" unless specifically revoked.

Under DMS Reg. 1, procedures are to be spelled out for setting up and tapping the defense set-aside materials. As it stood early this week, these would be shipped only to contractors and subcontractors holding military, atomic energy, and direct defense contracts.

"Macomber invented it . . . but he won't tell us what it does unless we give him a raise."

Contributing further to delay in the two orders was a final decision as to the status to be assigned the so-called defense supporting programs and some of the more essential types of heavy capital equipment.

### Take Care of 8-Ball

Best guess over the weekend was that in the end the final order would provide directive authority in a case where a defense supporting producer was clearly behind the 8-ball and lack of materials would plainly delay production.

Otherwise, only in "extreme cases," is it expected that provision will be made for aid to others. This is taken to mean specific cases of specific plants.

While the indicated 12-20-30 percentages would apply to total tonnage of mill production, the opposite is true of individual products. By product groupings, percentages would vary from anything above zero to 100 pct of output as in the case of nickel bearing stainless or shell quality steel.

### Control All Nickel

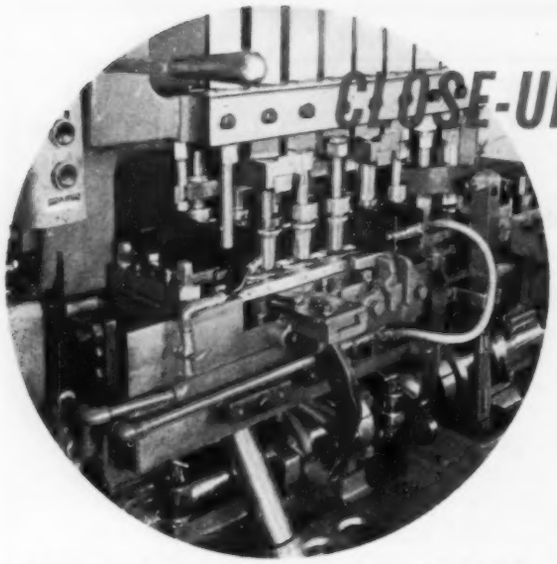
Mr. Flemming says the Government intends to "immediately raise third quarter allotment authority for the purchase of nickel bearing stainless steel to 100 pct of capacity."

Other than for nickel, not much light is being shed on the outlook for materials outside CMP which are still under control to varying degrees. Officials say that nickel must continue indefinitely under rigid control.

## No Change in May Draft Quotas

Army personnel requirements are continuing at an even pace, with the draft call for May set at 53,000. This figure is the same as the quota placed on the Selective Service System for February, March, and April.

Air Force, Navy, and Marine Corps are not planning to call for draftees in May.



Close-up of an 8-plunger WF cam eyelet machine showing tools and special attachments. Included are a lever type blank holder, a scrap box fitted with a compressed air blower and oscillating shutter, dovetailed punch holders and a hook type side stabber.

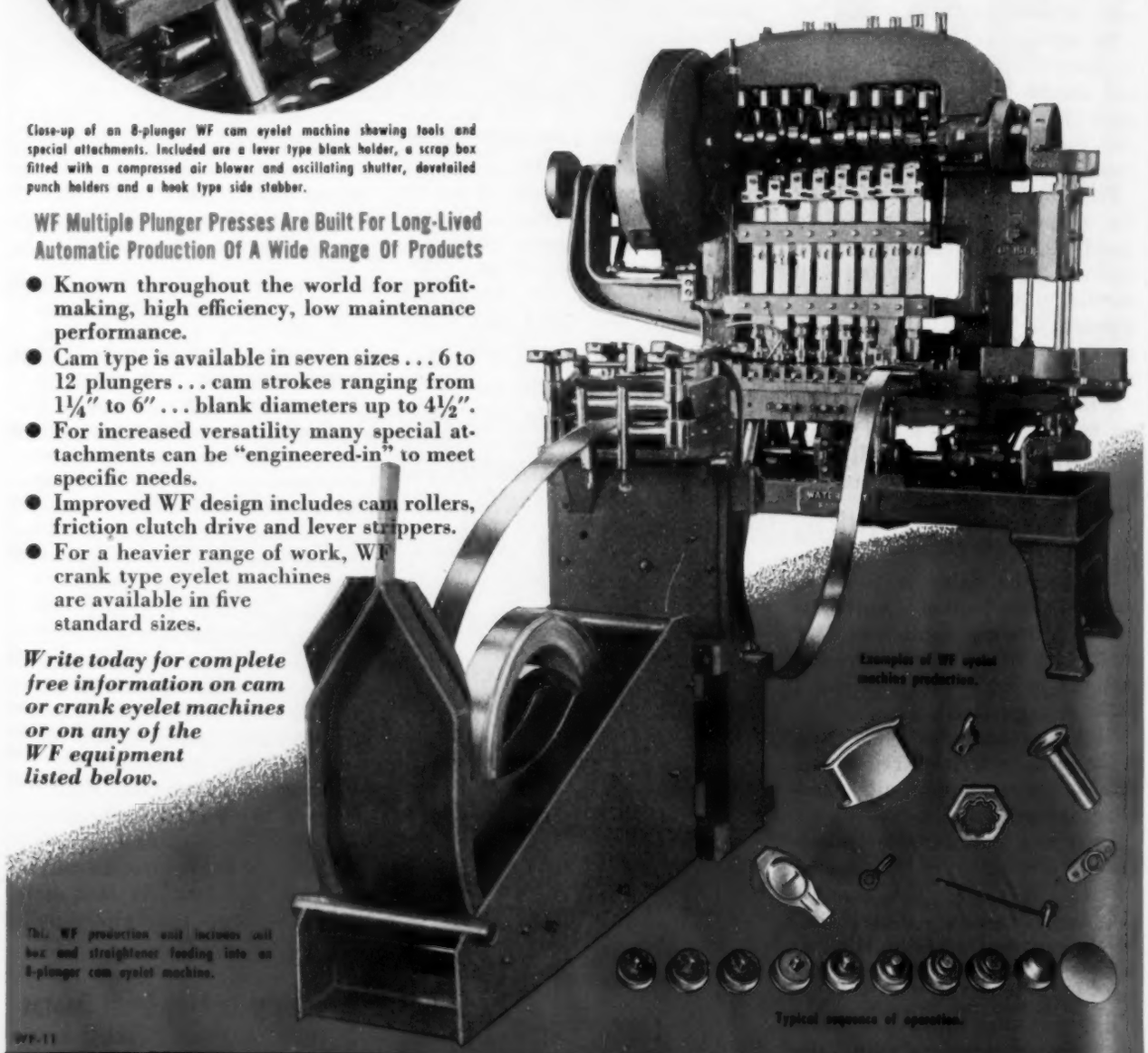
# CLOSE-UP of versatile mass-production ability

# Waterbury Farrel EYELET MACHINES

## WF Multiple Plunger Presses Are Built For Long-Lived Automatic Production Of A Wide Range Of Products

- Known throughout the world for profit-making, high efficiency, low maintenance performance.
- Cam type is available in seven sizes . . . 6 to 12 plungers . . . cam strokes ranging from 1¼" to 6" . . . blank diameters up to 4½".
- For increased versatility many special attachments can be "engineered-in" to meet specific needs.
- Improved WF design includes cam rollers, friction clutch drive and lever strippers.
- For a heavier range of work, WF crank type eyelet machines are available in five standard sizes.

***Write today for complete free information on cam or crank eyelet machines or on any of the WF equipment listed below.***



Examples of WF eyelet machine production.

This WF production unit includes coil box and straightener feeding into an 8-plunger cam eyelet machine.

Typical sequence of operation.

WF-11

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**POWER PRESSES** — Crank, Cam and Toggle; also Rack and Pinion Presses • Eyelet Machines • Multiple Plunger Presses • Horizontal and Hydraulic Presses, etc. **MILL MACHINERY** — Rolling Mills: Strip, Rod, Wire Flattening, (For Ferrous and Non Ferrous Metals) • Also Slitters • Straighteners • Cut-off Saws • Coilers • Winders, etc. **WIRE MILL EQUIPMENT** — Continuous Wire Drawing Machines (Upright Cone and Tandem) • Wire Flattening Mills • Chain Draw Benches • Painters • Swagers • Bull Blocks • String-up Machines • Spoolers, etc. **COLD PROCESS BOLT & NUT MACHINERY** — Headers (all types) • Rivet Machinery • Trimmers • Thread Rolling Machines • Slotters • Nut Formers and Tappers, etc.

# Railroads Try to Keep ICC Happy

**Ask lower class rates on western traffic to East . . . Change would have little effect as most West Coast traffic moves on lower "negotiated" commodity rates—By T. M. Rohan.**

Western railroads are throwing shippers and the Interstate Commerce Commission a bone this week.

Public proposals will be issued next week on a new schedule of about 25 pct lower class rates for shipments between Mountain Pacific territory and points east of the Rockies. In late April, the first of nine public hearings in western towns will be held, joined with hearings on another docket issued last month, proposing realignment of all class rates within the territory west of the Rockies.

**Won't Mean Much** . . . New schedules generally will amount to more on paper than in actual impact, since about 98 pct of western traffic moves on much lower commodity rates.

Proposals are a partial "giving-in" to continued ICC pressure for a uniform class rate which neither the railroads nor the major portion of Pacific Coast shippers want. The ICC, which has so far imposed the structure on the southwest and middle west, can claim results in its periodic congressional report and a legal proceeding will be avoided.

**Rates Negotiated** . . . Transcontinental railroad class rate schedules have been largely unchanged since 1912, except for periodic general increases. Commodity rates, which actually move the bulk of the tonnage, have traditionally been "negotiated" by shippers and railroads.

Western shippers need low rates to compete in the Midwest and East against much shorter haul items from the South and Southwest. Coastal shipping and trucking offer heavy competition and act as a natural damper on rail rates.

**Would Cut Competition** . . . West Coast distributors and shippers would be hardest hit by a mileage rate system. At present, machinery goes on commodity rate from Chicago to either Reno, Nev., or San Francisco for $2.98 per 100 lb. Under the new class rate as now proposed, it would be $2.70 to Reno and stay $2.98 to San Francisco. If the present ICC-sponsored class-rate scale were extended beyond the Rockies, displacing commodity rates, it would be $2.45 to Reno and $3.08 to San Francisco.

Thus, large jobbers of eastern goods in San Francisco, Los Angeles, Portland and Seattle would not be able to compete so effectively with local distributors in inland areas like Reno and California's central valley.

**Wire Products Climb** . . . California Wire Cloth's sales in California have tripled in the last 5 years, and expansions and modernizations are in the offing.

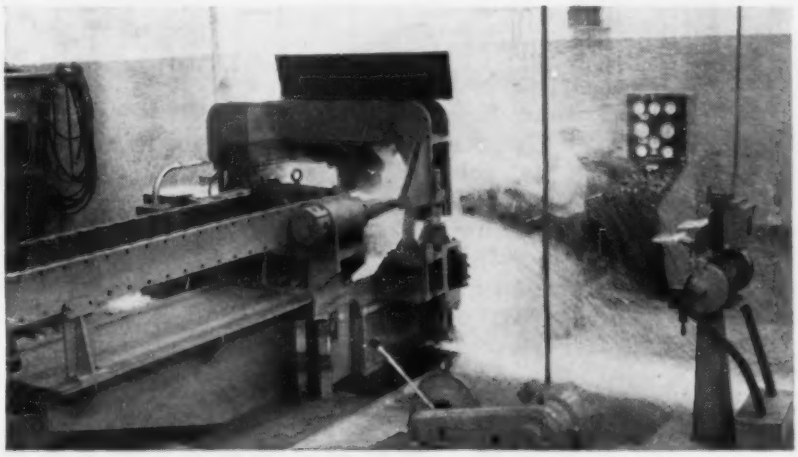
A. F. Franz, president of Colorado Fuel and Iron Corp., the parent company, said on a western swing last week the firm's Oakland plant will soon get new looms, wire drawing equipment and other facilities. These will improve production, cut cost and extend the range of products.

First expansion will be at the Oakland plant now producing about 3500 tons monthly and possibly later at the South San Francisco plant.

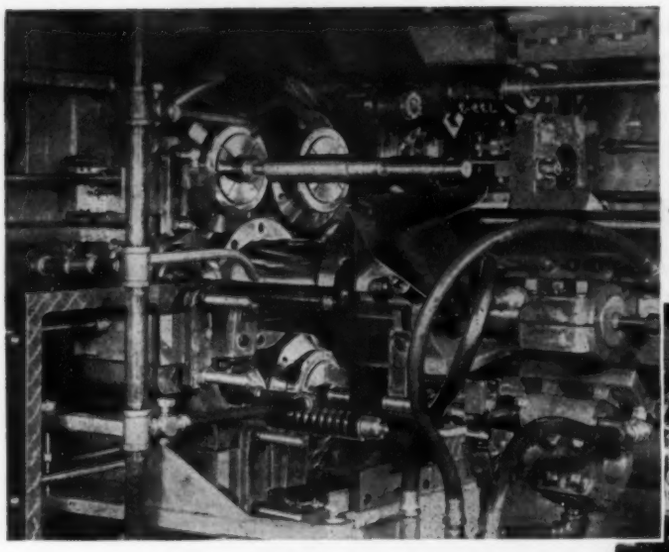
Sales for the entire company, now the nation's ninth ranking sales producer, will hit $300 million for the fiscal year ending June 30, Mr. Franz said.

**Recruiting** . . . United Steel Workers President David J. McDonald is going to have to beat the bushes to find any unorganized western metal miners. Western labor relations and statistical authorities agreed last week pickings would be slim on any CIO drive to organize in the West.

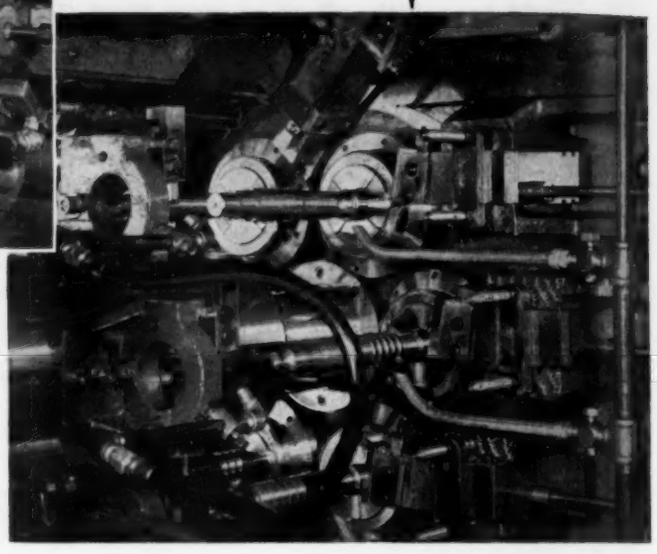
With few exceptions, iron ore miners are already in the USW. Copper is heavily organized by the rival Mine, Mill and Smelter Workers in Arizona and Montana. There are some CIO Steel Workers in lead and zinc mines in Utah and Idaho. But any major drive would probably be directed against the MM&SW, evicted by the CIO.

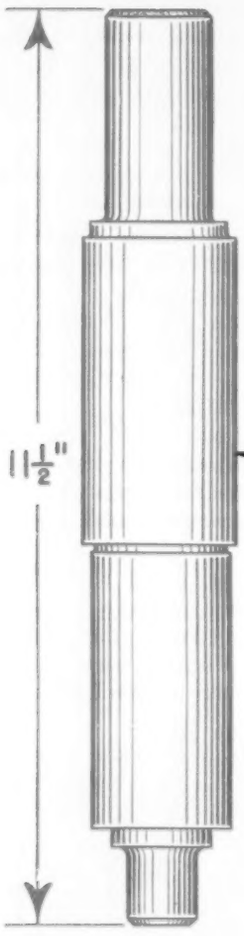


**WELDING MACHINE** made by Taylor-Winfield (800 kva) clamps metal tube for joining. It was built to specifications of Douglas Aircraft Co., Long Beach Div., Calif.



*Tooling Area 3¼-SIX*
*Front Side Rear Side*






*Automotive Transmission Shaft*

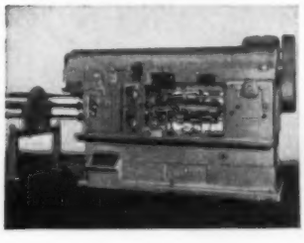
A very good reason why CONOMATICS handle a wider variety of machining operations per single chucking is their greater number of tooling positions.

# WITH MORE TO SELL THERE'S MORE TO TELL

Whether you're selecting a new golf club, motor car, or multiple spindle bar automatic, you want what best fits into the "scheme of things."

Before you can be sure that any product will meet your requirements you must have information. And you can judge only by that at hand or available. Complete information lets *you* decide what's important to *you.* That's as it should be.

There's always more information to be had about the product that has more to offer. It's that way about CONOMATICS. And you can always have *complete* information. If you will write, wire, or phone, you can have it now.



**Conomatic** CONE AUTOMATIC MACHINE COMPANY, INC. WINDSOR, VT., U.S.A.

# Buyers—Better Get In While It's Good

**Except for critical tools, civilian buyers can expect fairly normal deliveries . . . But market may change later because of government orders, possible price increase—*By E. C. Beaudet.***

There's no time like the present —for buying machine tools. Machinery builders believe this because they are anxious to strengthen their sagging backlogs. But it's also a good time for buyers, because they now have an opportunity to order with assurance that deliveries will be normal.

Except for builders making tools urgently need by the government, backlogs of most firms average about 9 months.

**Deliveries Reasonable** . . . Standard jobbing and tool room equipment are reported in fairly good supply, with reasonable delivery being quoted on planer-type milling machines, single-spindle drill presses, engine lathes and radial drills.

Special high-production equipment and tools on the "critical list are, of course, not so available. But the recent amendment to M-41 should mean that defense-supporting users and civilians will be getting more of these tools.

**Pressure From Automen** . . . Strong demand from high production industries, especially the automotive, is expected to keep pressure on special equipment.

Aside from the greater availability of machine tools, there are other factors which seem to make this an especially good time to buy. Many industry spokesmen believe the current lull in defense buying is only temporary and suggest that buyers order now.

**More Government Orders** . . . If recommendations of the Advisory Committee on Production Equipment are adopted, a substantial number of new government orders will be placed near the end of '53.

As a result buyers how have an opportunity to book orders before government requirements again become urgent. More government buying for defense is expected even if the Vance plan is not adopted.

**Prices May Rise** . . . Another factor buyers should consider is the possibility of a price rise. Although growing competition within the industry will tend to keep prices from going up, labor and materials are not expected to stand still during the rest of the year.

It may be that there will be enough pressure to force some prices up sometime this year.

**Expand Facilities** . . . Government efforts to increase production facilities of builders making long lead time or "elephant" machine tools started with a recent award of certificates of necessity to two companies. Firms involved are G. A. Gray Co., Cincinnati, and Onsrud Machine Works, Chicago.

G. A. Gray's expansion includes building two sizable plant additions along with plant modifications to accommodate a variety of new major machine tools.

Expansion will cost about $300,000 to $400,000. Fast tax-writeoffs of 100 pct have been granted the company.

**GSA Buying** . . . Additional equipment to be installed in the plant will be purchased by the General Services Administration. It will be operated by G. A. Gray on a rental basis, payments being made only to cover periods when the tools are in use.

The Onsrud expansion calls for a $1.5 million expansion of production facilities with a 90 pct fast tax-writeoff provision.

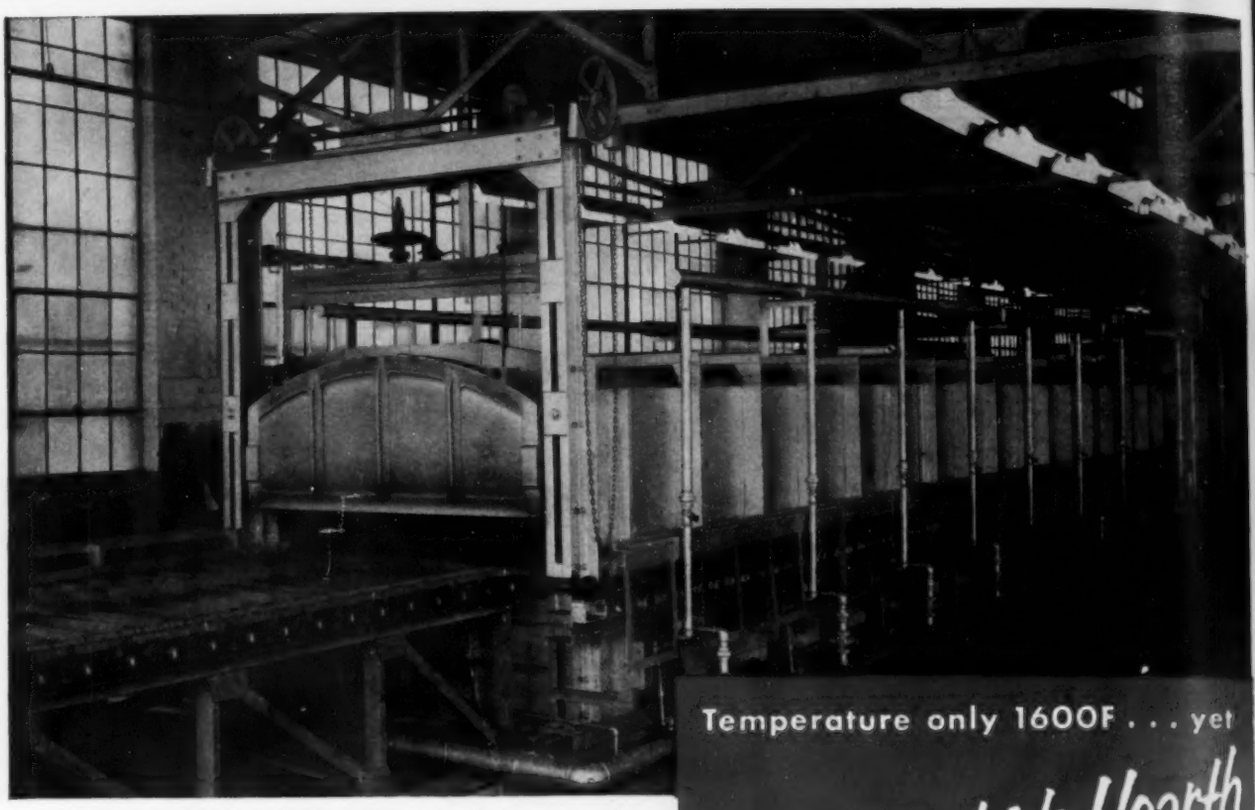
**British Trailing** . . . The British government which supports everything from railroads to false teeth seems to be in the dark ages as far as heavy presses are concerned.

High Duty Alloys, a British firm engaged in stampings and forging aircraft components, recently unveiled a 12,000-ton hydraulic press. It's said to be the largest of its size there. The U. S. now has presses operating up to 18,000 tons and one under construction for the Air Force of 50,000 tons.

**Won't Pay for It** . . . The British aircraft industry and Ministry of Supply have had considerable discussion about heavy hydraulic presses. But neither is willing to put up the money to build them. They still have some doubts about their practicality.

Designs for heavy presses of 50,000 tons have been made. But it remains for the aircraft industry to decide whether or not there would be enough work for Heavy Duty Alloys to make the investment commercially feasible.

"I hear he's an expert from India who came over to study our machine tools."



Temperature only 1600F . . . yet

# Silicon Carbide Hearth Proves Best

These armor-plate hardening furnaces, built by The Drever Co. of Philadelphia, Pa., range from 40′ to 60′ long, by about 7′ wide. There are seven furnaces like this operating at various plants. Each is equipped with a CARBOFRAX hearth. Average hearth life ranges from 18 to 36 months, depending on tonnage handled.

## Saves fuel . . . Heats more rapidly, and uniformly

This is a continuous roller-hearth hardening furnace, used for treating armor plates (up to 6′ wide, up to 20′ long, and in varying thicknesses up to 3″). It is under-fired with oil and/or gas to a chamber temperature of 1600 F. The work is carried on metal rollers over a hearth made of CARBOFRAX silicon carbide tile.

It is interesting that CARBOFRAX refractories were selected even though two of the outstanding properties of this material — its resistance to high temperatures and abrasion — are not brought into play. The reason for their selection, of course, lies in the tremendously rapid thermal conductivity of CARBOFRAX refractories. They conduct heat 11 to 12 times faster than fireclay. The result is a far more efficient furnace; one that heats uniformly, and can be closely controlled. It also takes less fuel — and the refractories are exceptionally long lasting.

This application brings home another point — i.e. not all silicon carbide refractories are the same. Other brands have been tried in similar furnaces, but due to premature oxidation, could not approach the life of these CARBOFRAX hearths.

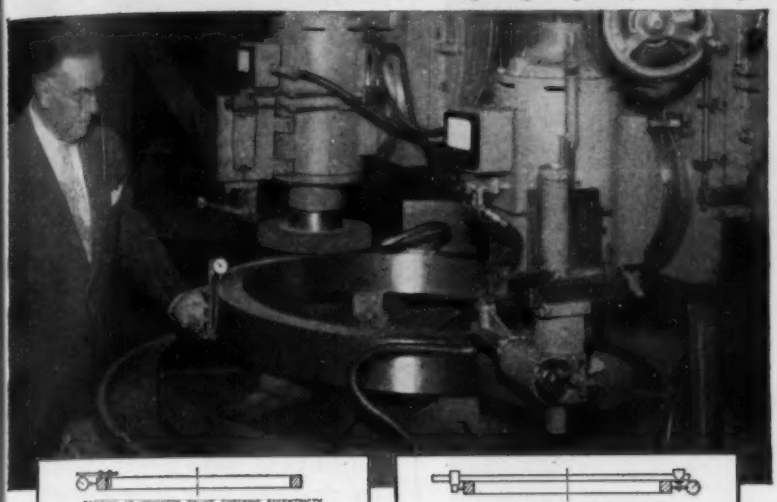
***Why Not Check Up?*** Chances are, your furnaces can be impressively improved by super refractories by CARBORUNDUM. Write or phone us today. Product data promptly furnished. Address: Dept. **B-33**, Refractories Division, The Carborundum Company, Perth Amboy, New Jersey.

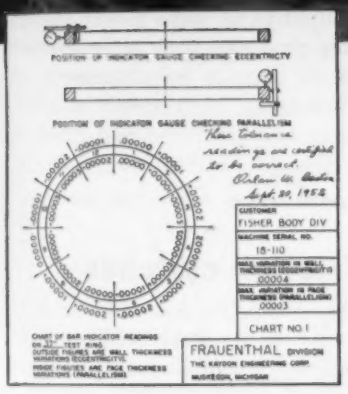
**CARBORUNDUM**
Trade Mark

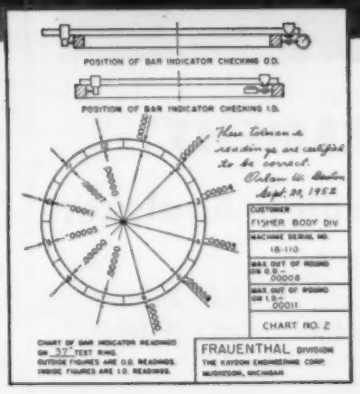
"CARBORUNDUM" AND "CARBOFRAX" ARE REGISTERED TRADEMARKS OF THE CARBORUNDUM CO. — WORLD'S LARGEST MANUFACTURER OF SUPER REFRACTORIES

# GRINDING TO millionths*

## OF AN INCH






* *Our normal method of expressing tolerances in tenths-of-thousandths of an inch became inadequate when precision was attained to fractions of tenths-of-thousandths, expressed best in MILLIONTHS of an inch.*

**Utmost precision proved by meticulous tests, and certified by Orlan W. Boston,** Chairman, Department of Production Engineering, University of Michigan. He witnessed tests at Frauenthal plant in Muskegon and certified their validity on precision grinding of a 37-inch test ring, on Frauenthal Grinder No. 18-110 (shipped to Fisher Body Division for grinding tank bearings).

## You get TOP PRECISION with Frauenthal Grinders

The certified readings listed at left are much closer than the 200-millionths of an inch precision specified for these machines. You can get similar results on other sizes of Frauenthal Multiple-Head Super-Precision Cylindrical Grinders, up to 140-inch diameter grinding on the Series 2200 machines. Uniformity of precision is assured in concentricity, parallelism and roundness. You can make many combination settings of grinding-spindle positions for a wide variety of simultaneous grindings of outside, inside and faces. Details on request.

**PRECISION GAUGE READINGS • CHART NO. 1**

| MAX. VAR. IN FACE THICKNESS (Parallelism) | | | | MAX. VAR. IN WALL THICKNESS (Eccentricity) | | | |
|---|---|---|---|---|---|---|---|
| Station | Reading | Station | Reading | Station | Reading | Station | Reading |
| 1 | .000000" | 7 | .000000" | 1 | .000000" | 7 | +.000020" |
| 2 | +.000010" | 8 | +.000020" | 2 | +.000010" | 8 | +000010" |
| 3 | +.000030" | 9 | +.000030" | 3 | +.000020" | 9 | .000000" |
| 4 | +.000030" | 10 | +.000030" | 4 | +.000020" | 10 | −.000010" |
| 5 | +.000030" | 11 | +.000030" | 5 | +.000010" | 11 | −.000020" |
| 6 | +.000010" | 12 | +.000020" | 6 | +000020" | 12 | −.000010" |
| Maximum Variation in Parallelism: .000030" | | | | Maximum Variation in Eccentricity: .000040" | | | |

**PRECISION GAUGE READINGS • CHART NO. 2**

| MAX. OUT-OF-ROUND ON O. D. | | | | MAX. OUT-OF-ROUND ON I. D. | | | |
|---|---|---|---|---|---|---|---|
| Station | Reading | Station | Reading | Station | Reading | Station | Reading |
| 1 | .000000" | 4 | −.000050" | 7 | .000000" | 10 | −.000110" |
| 2 | −.000020" | 5 | −.000080" | 8 | .000000" | 11 | −.000070" |
| 3 | −.000040" | 6 | .000000" | 9 | −.000050" | 12 | .000000" |
| Maximum Variation, Outside Diam: .000080" | | | | Maximum Variation, Inside Diam: .000110" | | | |

Series 1800

## *What is YOUR Grinding Problem?*

Through more than a decade of toolroom and production grinding, Frauenthal Grinders have been performance-proved on tough precision jobs, such as helicopters, jet engines, army and navy tanks and gunmounts, Diesel engines, machine tools, 120-inch diameter KAYDON precision bearings and similar products. We'll be glad to work with you on difficult grinding problems.

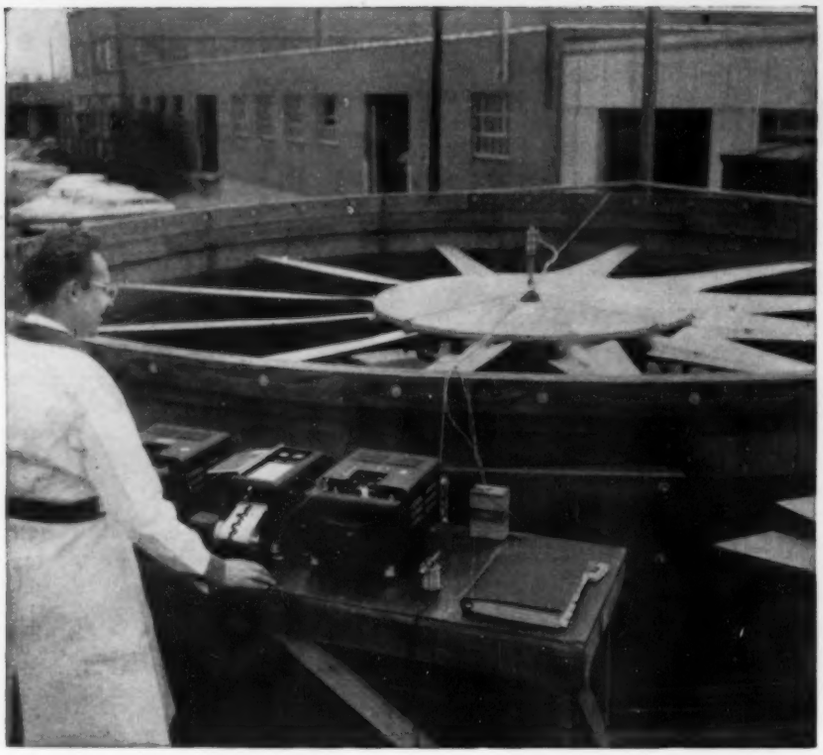
**made in 10 standard sizes . . . conforming to essential J.I.C. specifications**

| | Series 1800 | Series 2000 | Series 2200 |
|---|---|---|---|
| Table sizes | 30" 36" 42" 48" | 60" 72" | 110" 120" 130" 140" |
| Maximum Swing | 56" 56" 56" 56" | 72" 88" | 120" 130" 140" 150" |

*Ask for Bulletin*

**Frauenthal** Division THE KAYDON ENGINEERING CORP., MUSKEGON, MICH.

**PRECISION-GRIND INSIDE, OUTSIDE AND FACES SIMULTANEOUSLY**



# STRESS MEASUREMENT

## speeded with Brush Recording Analyzer

YOU can simplify and speed product development with Brush Recording Analyzers . . . they provide written records of performance — immediately.

By mounting strain gages on this 20-foot cooling tower fan, and amplifying and recording the signals with a Brush Recording Analyzer, engineers of The Marley Company accurately observe operating stress on the fan, and can make quick adjustments of equipment for changing conditions.

This proves a highly practical method of testing new design ideas, since measurements are recorded quickly and easily. The Marley Company, large producer of water cooling towers, also uses Brush Recording Analyzers to check gear reducers, drive shafts, and structural members under actual service conditions.

Investigate Brush Recording Analyzers to streamline *your* testing of stress, strain, torque, vibration, pressure, and electrical characteristics. Brush representatives are located throughout the U.S. In Canada: A. C. Wickman, Limited, Toronto. For bulletin write Brush Electronics Company, Dept. CC-3, 3405 Perkins Avenue, Cleveland 14, Ohio.

PIEZOTRONICS . . . Brush has prepared this informative 24-page brochure describing the functions and applications of piezo-electric materials. Write for free copy — it may spark a product improvement idea.

BRUSH ELECTRONICS COMPANY

INDUSTRIAL AND RESEARCH INSTRUMENTS
PIEZOELECTRIC MATERIALS • ACOUSTIC DEVICES
MAGNETIC RECORDING EQUIPMENT
ULTRASONIC EQUIPMENT

BRUSH ELECTRONICS

*formerly*
*The Brush Development Co.*
*Brush Electronics Company*
*is an operating unit of*
*Clevite Corporation.*


## —Free Publications—

*Continued*

### Acetylene cylinders

Detailed analysis of welded and seamless acetylene cylinders is contained in a new 4-p. bulletin issued by Coyne Sales Co. Concise, easy-to-read descriptions of cylinder caps, valves, safety devices, fillers and markings, plus photographs and technical drawings are included. *Coyne Sales Co.*

**For free copy circle No. 14 on postcard, p. 103.**

### Gear couplings

Seven major engineering advantages of fully crowned teeth in gear-type flexible couplings are described in a new bulletin available from American Flexible Coupling Co. Applications of Amerigear Couplings to solve power transmission problems such as excessive offset or angular misalignment, space limitations, high speeds and torque loads are described and illustrated. *American Flexible Coupling Co.*

**For free copy circle No. 15 on postcard, p. 103.**

### Friction clutches

Link-Belt Co. has issued a new folder on its Beyl friction clutches and clutch couplings. The clutches are offered in ten standard sizes ranging from 2¾ to 125 hp at 100 rpm. Positive action and easy adjustment are features of these units. The folder contains schematic drawings and dimensional tables to insure selection of the right clutch or clutch coupling for every requirement. *Link-Belt Co.*

**For free copy circle No. 16 on postcard, p. 103.**

### Boiler controls

Copes-Vulcan Boiler Control is said to provide a completely integrated system for controlling combustion, feed water, boiler steam temperature and boiler cleaning. Designed especially for modern central station boilers, the system may also be used effectively on smaller units. It is adaptable to all generating capacities, load ranges, fuels and methods of firing. *Copes-Vulcan Div., Continental Foundry & Machine Co.*

**For free copy circle No. 17 on postcard, p. 103.**

"Buffalo"

# Tips on Metal Bending

"Buffalo" BENDING ROLLS CAN SAVE YOU MONEY!

PROBLEM: Bend commercially perfect circles, arcs or spirals at a profitable production speed from any of these standard sections:

1. Angles, leg-out
2. Angles, leg-in
3. Beams on flanges
4. Channels, flanges in or out
5. Flats on edge
6. Flats on flat
7. Rounds
8. Squares
9. Copper tubes
10. Standard St. pipe
11. X heavy pipe
12. XX heavy pipe

SOLUTION: Use a "Buffalo" Bending Roll. It handles all these jobs and more, faster and cheaper than any other method.

Why not write for Bulletins 3344-A and 352-B today?

"Buffalo" Vertical Type Bending Roll.

"Buffalo" MACHINE TOOLS

DIAMOND JUBILEE 75TH ANNIVERSARY

**BUFFALO FORGE COMPANY**

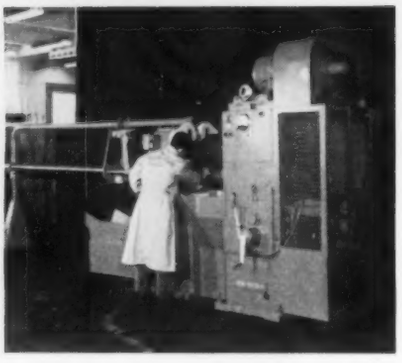
492 BROADWAY BUFFALO, NEW YORK

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

DRILLING PUNCHING SHEARING CUTTING BENDING

# NEW EQUIPMENT

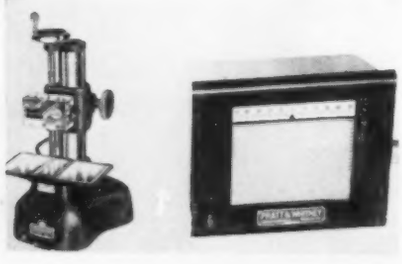
**New and improved production ideas, equipment, services and methods described here offer production economies . . . just fill in and mail the postcard on page 103 or 104.**



## Single spindle automatic has speed and strength

A new single spindle bar machine fulfills the requirements of master mechanics, production superintendents, and operators. It can serve the turret lathe department and the screw machine line. It has the speed for aluminum and the strength for high temperature alloys. The machine is so simple a man with no previous automatic experience can become a setup man in one week. Changeover from one average job to another can be done in 1¾ hr. Four standard cross slide cams cover all desired cross slide feeds. A universal turrent cam provides infinite variation in feed strokes up to 6¾ in. and preselection of 10 turret feeds. Complete programming of functions is possible. *New Britain Machine Co.*

**For more data circle No. 18 on postcard, p. 103.**



## Comparator has 110,000 to 1 magnification

An electrolimit circuit and gage block comparator stand, combined with a new electronic recorder, makes up an instrument with 110,000 to 1 magnification. It can be used for checking precision gage blocks and where extreme accuracy is necessary. The 11-in. recording scale is equal to only 0.0001 in., with each primary division equal to 0.000005 in. and secondary divisions equal to 0.000001 in. Recorder has pen lifter and chart drive switch for use as an indicating instrument. *Pratt & Whitney.*

**For more data circle No. 19 on postcard, p. 103.**

## Drum handling device requires no pallets

The Liftomatic drum handling attachment for fork trucks is an automatic, mechanical unit for engaging, transporting, placing and tiering drums without the use of pallets or dunnage. No hydraulic hoses or extra controls are necessary. It is capable of handling drums of any diameter or height, regardless of bead or rim size. Adjustable from 35 to 14 in., the jaws can handle any material without damage. Drums can be tiered or removed from maximum fork height and lack of prongs or platforms allow for exact positioning. *Lewis-Shepard.*

**For more data circle No. 20 on postcard, p. 103.**

## Transfer-matic machine does 188 operations

A special machine tool which does 188 operations on a tractor cylinder block, moves the work from station to station automatically. The machine mills the distributor boss; drills, bores and spot-faces the distributor hole; drills, chamfers and reams tappet holes; drills crankcase and miscellaneous oil holes; drills and reams oil filter and dipstick holes; drills, chamfers and taps the cylinder head, distributor mounting, oil pan and bearing cap holes. All operations are done at the rate of 72 pieces per hr at 100 pct efficiency. The machine has 22 stations—15 for machining, 1 for loading, 6 are idle. It stops automatically when a tool needs changing. *Cross Co.*

**For more data circle No. 21 on postcard, p. 103.**

*Turn Page*

telling the story of 'dag' dispersions

## Dry Films Lubricate Where Common Lubricants Fail

At temperatures over 500°F. most lubricants fail. This means that almost everywhere metal is worked a **'dag'** dispersion can save money and headaches.

**'dag'** dispersions of graphite form microscopically thin, *dry lubricating films* which fight friction beyond the burning-points of most oils. These dry films are unaffected by heat up to 750°F. . . . under some conditions up to 3000°F.

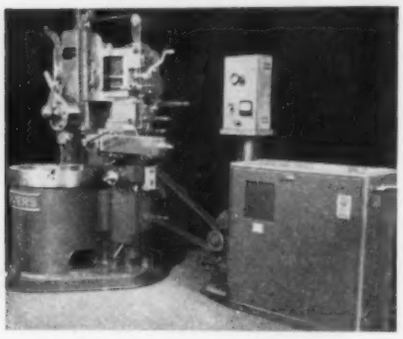
For more details on metalworking applications write us for Bulletin No. 426-13C.

*Dispersions of molybdenum disulfide are available in various carriers. We are also equipped to do custom dispersing of solids in a wide variety of vehicles.*

dag DISPERSIONS®

**Acheson Colloids Company,** Port Huron, Mich.
... also ACHESON COLLOIDS LIMITED, LONDON, ENGLAND
Units of Acheson Industries, Inc.

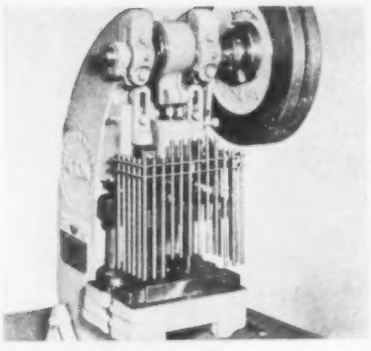
'dag' resin-bonded dry films for permanent lubrication



## Speed drive gives unlimited table-chuck speeds

Table-chuck speeds up to 212 rpm can be obtained with a new adjustable speed drive. The power unit governs motor speed and eliminates the eight-speed transmission, clutch, brake and lever controls of previous models. The control box has a rheostat control, and start, stop and jog pushbuttons. It can set and change motor speeds within a ratio of more than 16:1. Speeds may be changed while the machine is running, and the motor can be started or stopped without change in the speed setting. Dynamic braking is controlled by a stop button. Speed drive is on the Perfect 36 vertical turret mill. *Rogers Machine Works, Inc.*

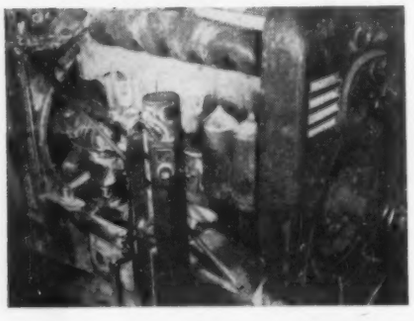
For more data circle No. 22 on postcard, p. 103.



## Punch press guard provides maximum safety

A barrier-type punch press guard provides maximum operator safety regardless of die used without sacrificing press efficiency. It fits all Benchmasters as well as other presses. By dropping numerous vertical rods through any pair of prelocated holes in horizontal guard plates a protective cage is set up around the die area. Almost any shaped contour can be formed by varying the height and position of the rods in the guard plates. Small clips hold the rods. To change pattern for a new die requires only seconds. Openings in the guard can be arranged to permit parts to be inserted in or ejected from the die. *Benchmaster Mfg. Co.*

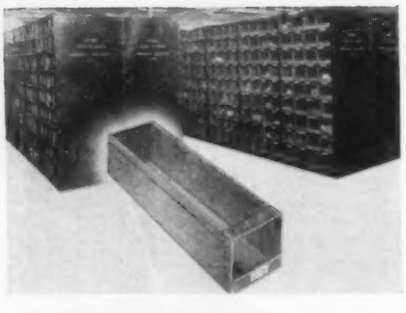
For more data circle No. 23 on postcard, p. 103.



## Engines kept ready to operate in coldest weather

Diesel engines used in cranes, switch engines, trucks and other equipment used outdoors can be kept ready to operate in the coldest weather safely and automatically with electric heat. Chromalox electric circulation heaters are attached to the engine block with angle iron. With flexible connections to the cooling system, regular types of antifreeze are circulated by natural convection through the heater and engine block, warming the engine in a short time. Special pumps are not required. Heaters are completely packaged units. *Edwin L. Wiegand Co.*

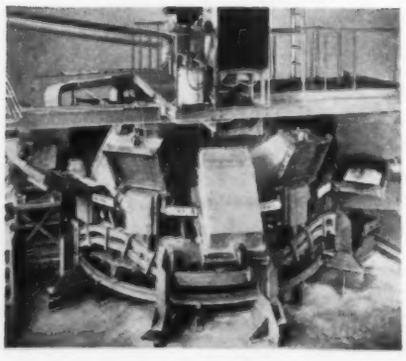
For more data circle No. 24 on postcard, p. 103.



## Bin boxes save inventory time and money

New bin boxes made of chemically hardened corrugated board save the cost of bin dividers and have a riser front to greatly increase bin capacity. Instead of scooping out contents of bin at inventory time, the entire box is easily pulled out and weighed. Each stored part having been given a multiple and with tare weight of the bin boxes constant, saving in time and effort is evident. Rigidity, dimensions and handling ease permit cross stacking for quick transfer. Boxes are made for 36 and 24-in. deep shelves. *Convoy, Inc.*

For more data circle No. 25 on postcard, p. 103.



## 12-station unit makes 500 shell molds per hour

An automatic 12-station unit, capable of making 500 shell molds an hour, requires only one man to operate it. Pattern size is 28 x 22 in. As a pattern carriage moves up, it engages a sand-resin hopper. Material falls on the pattern to form a shell mold. The mold travels through an oven heated by gas-fired radiant burners. It is fully cured when it emerges. The machine has an automatic proportioning system for sand, resin and wetting agent. Materials are thoroughly mixed and deposited in controlled quantities in the hoppers at each machine revolution. The machine can be operated with all patterns alike or with 12 different patterns. *Mechanical Handling Systems, Inc.*

For more data circle No. 26 on postcard, p. 103.

*Turn Page*

**THIS SYMBOL ALONE**
**DOES NOT ASSURE A FINE PRODUCT**

**but used like this...**

# BAKER'S MAGDOLITE®

**it is your guarantee of a quality dolomite**

BAKER'S MAGDOLITE is a dolomite of superior chemical, physical and mineralogical composition, whose properly burned, grain-size particles will help you get more uniform ingots, at lower fuel costs, with less defective production material.

The next time you order dolomite, specify BAKER'S MAGDOLITE—the original Deadburned Dolomite. The many years of experience of the J. E. Baker Company are your assurance that BAKER'S MAGDOLITE will always be 5 ways better: COMPOSITION, PREPARATION, STRENGTH, ECONOMY, QUALITY.

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# SMALL STAMPINGS

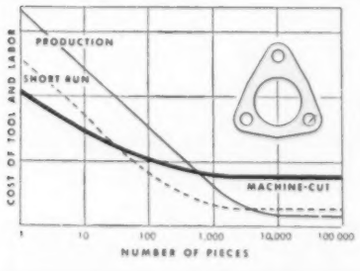
### A COST-SAVING, VERSATILE APPROACH TO THEIR MANUFACTURE

Possibly you've always thought that a quick look at the quantity involved decides how a stamping shall be made. Sometimes it is done that way but it isn't the sure way to lowest costs.

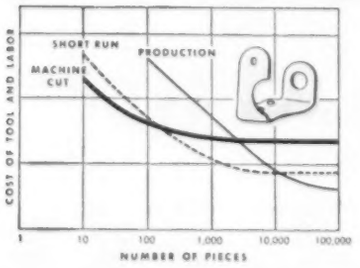
A more scientific approach by the STAMPINGS DIVISION of the Laminated Shim Company in Glenbrook, Connecticut frowns on the term "short run stamping." There is what is known as the short run *method* but there is no definite dividing point between short run and production quantities. Contour, tolerances, material, many other items all affect the manufacturing method when costs are being carefully figured.

### NO ONE METHOD IS ALWAYS CHEAPEST; THREE ARE NEEDED

**Machine-Cut Method**: The STAMPINGS DIVISION goes one step further than Short Run and Production Methods. The Machine-Cut Method, though not strictly a stamping operation is a valuable addition to stamping procedure. Custom built slitters, cutters, saws and files use experience-gained techniques to fashion the smaller quantities of parts. No dies are made; only stock punches are used. Obviously labor cost is understandably high but there is no tool charge.



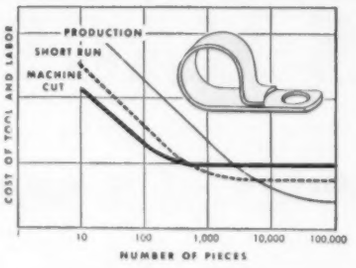

**Short Run Method**: As quantities increase (and depending upon the complications of contour, material, etc ) the economy of a temporary blanking die must be considered to eliminate the labor expense of machine-cutting. When this point is reached, manufacture is by the Short Run Method and the blanking is supplemented by other bench press operations. Here labor cost is at a medium level but a modest tool charge is incurred.




**Production Method**: As quantities increase the Production Method using standard dies with high speed automatic presses becomes more attractive. A relatively high tool charge can then be amortized over a great number of parts. Labor charge is negligible.

The Production Method as developed by the STAMPINGS DIVISION is offering unusual cost saving possibilities because of the new low-cost, full service Hecht-type die developed by the company for certain applications.

It is interesting to note that sometimes a very small quantity of parts would require a standard die because of complications or close tolerances or tough materials involved. Thus occasionally a very small quantity goes into the production classification.




### LOWEST COST IS ASSURED WHEN SUPPLIER HAS ALL THREE METHODS

The illustrations show typical stamped parts along with relative costs and breaking points for each of the three manufacturing methods. Unless a supplier can offer all three, his costs cannot always be low. For a given quantity, only *one* method can be most economical.

### ONE OR ONE MILLION PARTS FROM SAME SUPPLIER

An important corollary to the above is that an experimental part in small quantities can be handled by the same supplier when full production quantities are needed

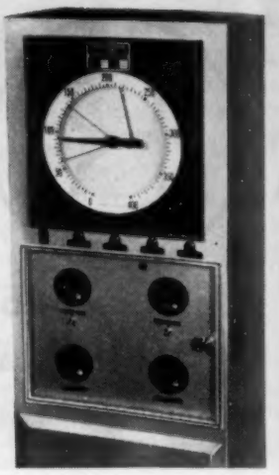
Further, it is important that a supplier be fully informed, if possible, on later or total requirements for a given part. As the charts point out, such information will affect manufacturing method and make possible cost reductions.

### FURTHER INFORMATION AVAILABLE

An illustrated 12 page brochure describing in greater detail the methods mentioned above is available on request to the
STAMPINGS DIVISION
Laminated Shim Company, Inc
3203 Union Street, Glenbrook, Conn.

## —New Equipment—

*Continued*



## Sand controller

Two recently developed units automatically control the physical properties of foundry molding sand. One, the Watertemp unit, adds the correct amount of water to each batch of sand to compensate for water lost due to evaporation. Use of the sand controller refines moisture control still further on the basis of working properties of the sand. It keeps a continuous record of tests for green permeability and green strength. *Harry W. Dietert Co.*

**For more data circle No. 27 on postcard, p. 103.**

## Thread cutting broach

A special high-speed steel thread broach taps holes in Chrome-Molly and stainless alloys that have been heat treated. Shearcutting action of the tool does not tear the threads and the chip comes out of the hole in one continuous piece. These tools are made in all standard sizes from Nos. 4 to 12 machine screw size, and from ¼ to 1½ in fractional sizes, in National course and National fine pitches. *Shearcut Tool Co.*

**For more data circle No. 28 on postcard, p. 103.**

***Turn Page***

Case History IA-104

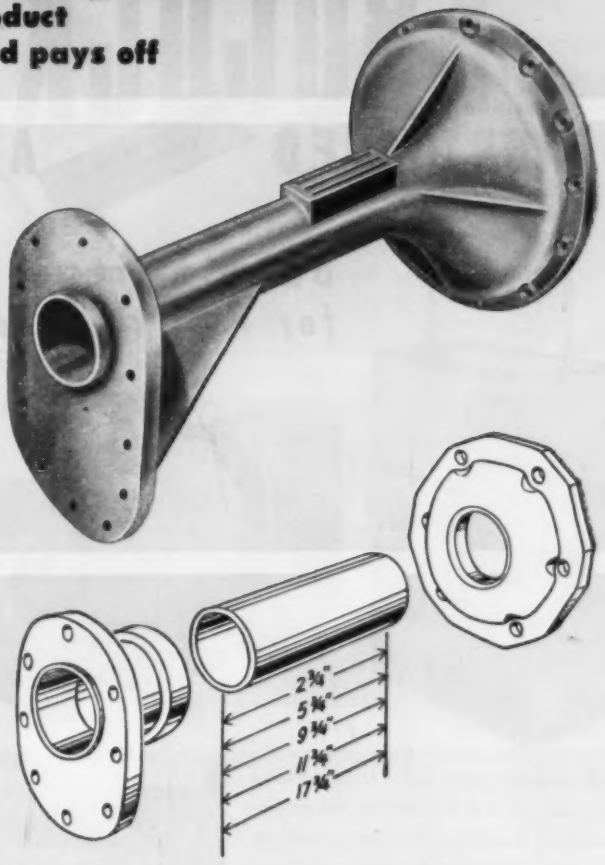
# Here's what we mean by SUPERIOR ENGINEERED FOUNDRY PRODUCTS...

**. . . an example of how proper product development at the drawing board pays off**

## PROBLEM:

Tractor Drive Spacers were required in five different sizes, making them expensive to produce as one-piece steel castings. Each size would require:

1. A separate set of expensive core boxes and pattern equipment.
2. A separate set of flask equipment . . . expensive cleaning and handling procedure.
3. A separate machining setup . . . expensive jigs and fixtures.
4. An excessive amount of critical steel . . . average weight would be 52.5 lbs.




## OUR SOLUTION:

**FOUNDRY ENGINEERED CAST-WELD CONSTRUCTION**

Two simple machined steel castings plus one piece of pipe cut to required length and welded to the castings equals five different sizes of Spacers.

## RESULT: 38.4% SAVINGS

Tractor Drive Spacers are being made in the five sizes by our foundry at a greatly reduced cost. All that is required is:

1. One set of inexpensive pattern equipment and one core box.
2. Only one size of flask equipment . . . simplified cleaning and handling.
3. One machining setup . . . one set of jigs and fixtures.
4. Less steel . . . average weight reduced to 37.1 lbs.

These assemblies have been proved in tough tractor service.

**TOTAL COST OF PART REDUCED 38.4%**

**YOU, TOO, CAN GET SAVINGS LIKE THESE! CONSULT OUR PRODUCT DEVELOPMENT SECTION REGARDING YOUR PROBLEM . . . WHILE IT'S STILL ON THE DRAWING BOARD**

Let our foundry engineers help you conserve critical materials.

ENGINEERED FOUNDRY PRODUCT

Since 1916

**SUPERIOR STEEL AND MALLEABLE CASTINGS CO.**

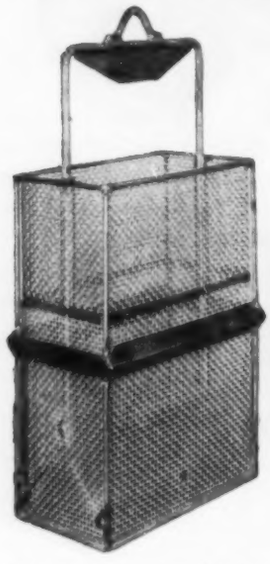
**BENTON HARBOR, MICHIGAN, U. S. A.**

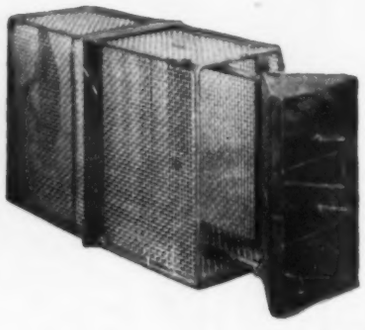
# ROLOCK

## FABRICATED ALLOYS

HEAT AND CORROSION RESISTANT

### DROP-BOTTOM BASKETS
*for fast release of load*

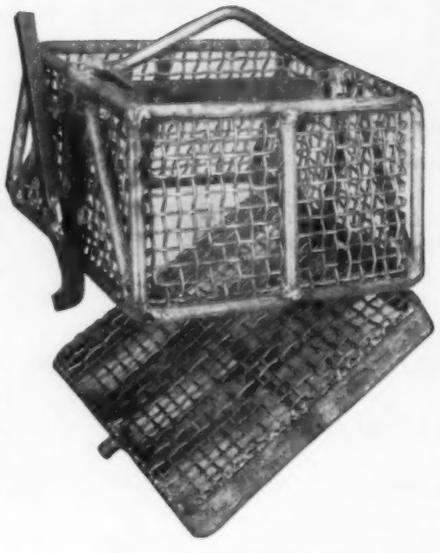




Both baskets were fabricated-welded from alloys best suited for the exposures and, like other Rolock products, were job-engineered to suit the specific use. Among the thousands of designs created by Rolock engineers there are many that, with slight changes in shape or size, will fill the requirements of your heat treating plant or department.

To help you solve such problems we offer two excellent catalogs . . . No. B-8 Heat Treating Section and No. B-9 Corrosion Resistant Section. They picture and describe a great variety of designs in Baskets, Crates, Trays, Racks, Fixtures, Screen-Grids, Retorts, Muffles, Tanks, Sinks, Hooks, Chains, etc.

We have put more practical material into these catalogs than you will find in any other similar publications. COPIES ARE AVAILABLE ON REQUEST.



Drop-bottom salt pot basket (top) has lifting bars attached to solid sheet bottom. When assembly sets into holder frame over quench tank, bottom drops, releases load.

Above is a heavy duty basket with extra rugged hinged bottom, released instantly by disengaging lever from pin. Note single point suspension.

*Offices in:* PHILADELPHIA • CLEVELAND • DETROIT • HOUSTON • CHICAGO • ST. LOUIS • LOS ANGELES • MINNEAPOLIS • PITTSBURGH

**ROLOCK INC. • 1362 KINGS HIGHWAY, FAIRFIELD, CONN.**

JOB-ENGINEERED for better work
Easier Operation, Lower Cost

RRLOB


## —New Equipment—
*Continued*

### Iron-powder metal

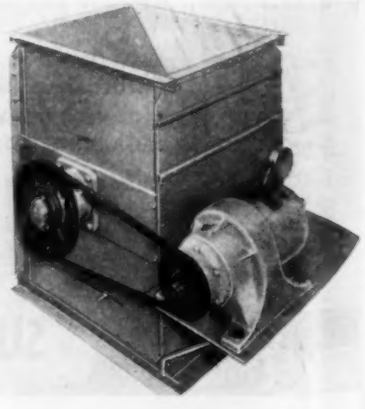
An iron-powder metal, known as Steel Oilite, has physical properties comparable to SAE 1010, 1020 or 1030 steels. Products made with the new powder are said to have two to three times the ductility of previous iron-powder products and can withstand a pressure of 70,000 psi. It can withstand high stresses without cracking. Because of its ductility and strength, it can be used for gears, cams, brackets and lever arms which require forgings or bar stock for strength. While having some porosity, it is not intended for self-lubricating applications. The new material can be plated, hardened by quenching or carburized and hardened. *Chrysler Corp.*

**For more data circle No. 29 on postcard, p. 103.**

### Magnetic separator

Removal of tramp iron and medium-fine ferrous matter from materials conveyed by spouts and chutes is done automatically by an improved magnetic drum. Changeable sheave sizes for various operating speeds, stainless steel shells to resist corrosion, dust-tight construction, adjustable feeder assemblies and other innovations increase the efficiency of the unit. As material reaches the drum, a magnetic field attracts and holds ferrous particles to a revolving shell which carries them through a stationary magnetic field. They are held until carried beyond a divider and out of the magnetic field. *Eriez Mfg. Co.*

**For more data circle No. 30 on postcard, p. 103.**



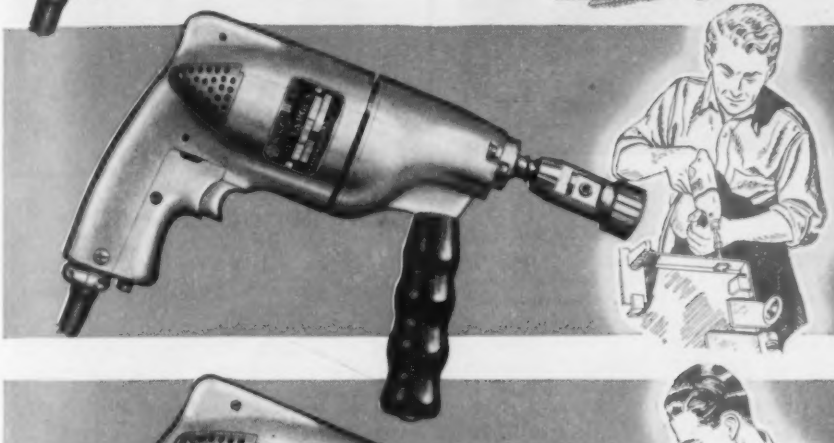
***Turn Page***

# Hire these Speedy Production Triplets

## better built by Black & Decker!

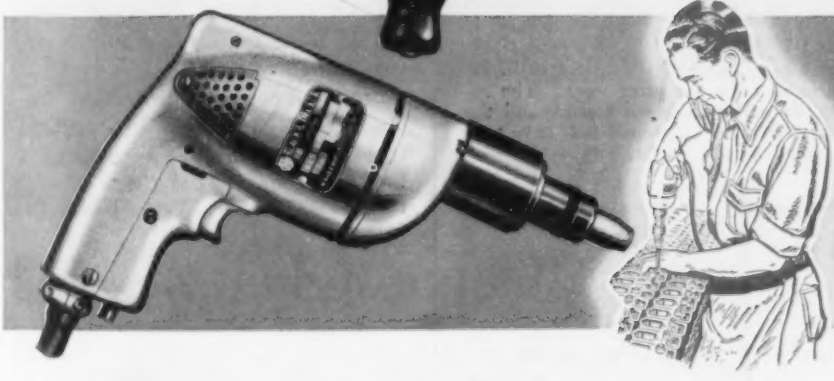
**DRILL IT FASTER with a Black & Decker ¼" HOLGUN***

Heavy-Duty, 25% more powerful—can't be stalled at rated capacity! Only 7⅛" long, ⅞" spindle offset; weighs only 3¼ lbs. Unmatched for close quarter drilling in wood, metal and plastics!



**TAP IT FASTER with a new Black & Decker ¼" TAPGUN***

Threads holes in steel, cast iron, brass, aluminum, 8 times faster than by hand. Only 10¾" long; weighs only 4¼ lbs. Automatic reversing mechanism greatly reduces tap breakage!



**DRIVE IT FASTER with a Black & Decker No. 12 SCRUGUN***

Now 50% more powerful for increased capacity! Only 9" overall; weighs only 3¼ lbs. Positive and adjustable clutch, 90° Angle Head models.

## More output, fewer rejects, less fatigue!

THESE fast-stepping Black & Decker production triplets have a lot in common . . . and it's all good medicine for your production schedule! They're all powered by B&D-built universal motors, tailor-made for the specific tools they drive. They're all perfectly balanced and matched in design, with the famous "Pistol Grip and Trigger Switch" to give you easier handling, less worker fatigue. They're all engineered to turn out more uniform work at lower cost with fewer rejects. And they're all packed with the strength and stamina that Black & Decker builds into every part, every tool!

Find out how these production triplets can save you money, muscle and man-hours. See your nearby Black & Decker Distributor for a demonstration. Write for free catalog of over 100 Electric Tools to: THE BLACK & DECKER MFG. CO., 603 Pennsylvania Ave., Towson 4, Maryland.

*Trade Mark Reg. U. S. Pat. Off.

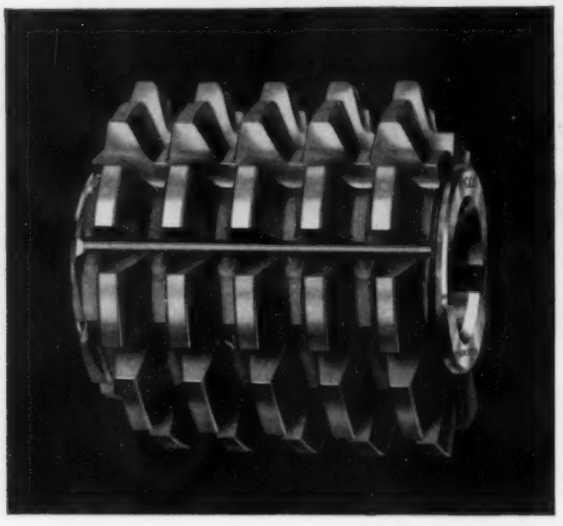
LEADING DISTRIBUTORS EVERYWHERE SELL

B&D Black & Decker

PORTABLE ELECTRIC TOOLS

# Accurate Unground Hobs

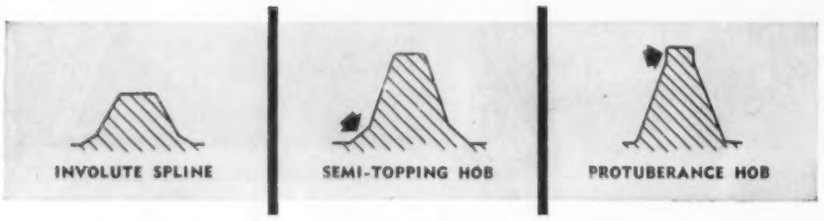
## REDUCE TOOL COSTS



### *For Semi-Finish Hobbing*

Since Accurate Unground hobs cost considerably less than ground hobs, they should be applied whenever job requirements permit. Class C Accurate Unground hobs are used primarily on pre-shaved gears. Many users consider the gears produced by these hobs to be sufficiently accurate for efficient operation of the shaving cutter. Special features, such as the ramp for cutting the chamfer and the protuberance for producing undercut, can be held to sufficiently close tolerances to satisfy the requirements of most gears.

For increased production of pre-shaved gears, multiple-thread Accurate Unground hobs are often used. The increased production of the multiple thread feature and the reduced tool cost of the Accurate Unground hob have provided exceptional savings on many jobs.




### *For Finish Hobbing*

Accurate Unground hobs are also used for some *finish* hobbing jobs, although they are not as consistently accurate as ground hobs. Consequently, they are used for finishing jobs which do not require the consistently closer tolerances of ground hobs. In addition to the saving in tool cost, Accurate Unground hobs often have a greater tool life than those with a ground form.

To determine the advisability of adapting Accurate Unground hobs to your jobs, consult your nearest Barber-Colman representative. He will be glad to help you with any of your gear problems.

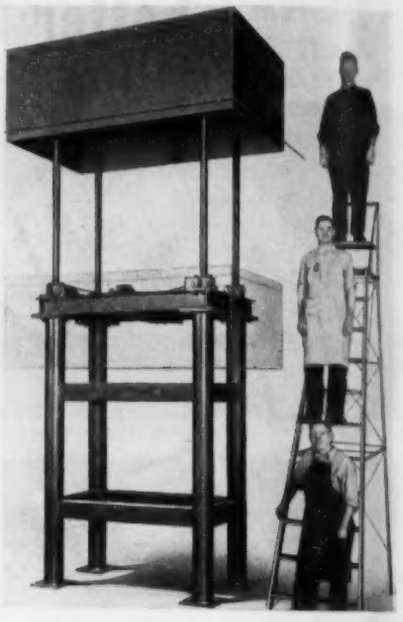
**FOR ACCURACY SELECTION — *Send for Copy of New Hob Standard Tolerances***

BARBER COLMAN

**Barber-Colman Company**

GENERAL OFFICES AND PLANT, 7113 ROCK STREET, ROCKFORD, ILLINOIS

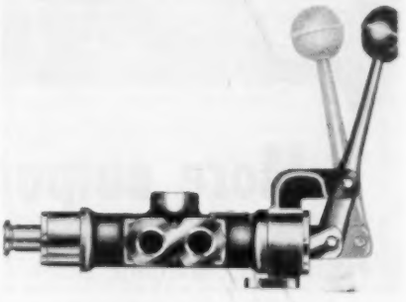


## Long-legged elevator

Installed in the basement, a long-legged elevator handles 6-ft stacks of sheeted paper at the delivery end of a sheeting machine on the ground floor. The elevator is operated by a 2 hp motor with a reversing magnetic starter, limit switch and overload protection. Table size is 48 x 84 in., vertical travel 78 in. and load capacity 3 tons. *Hamilton Tool Co.*

**For more data circle No. 31 on postcard, p. 103.**

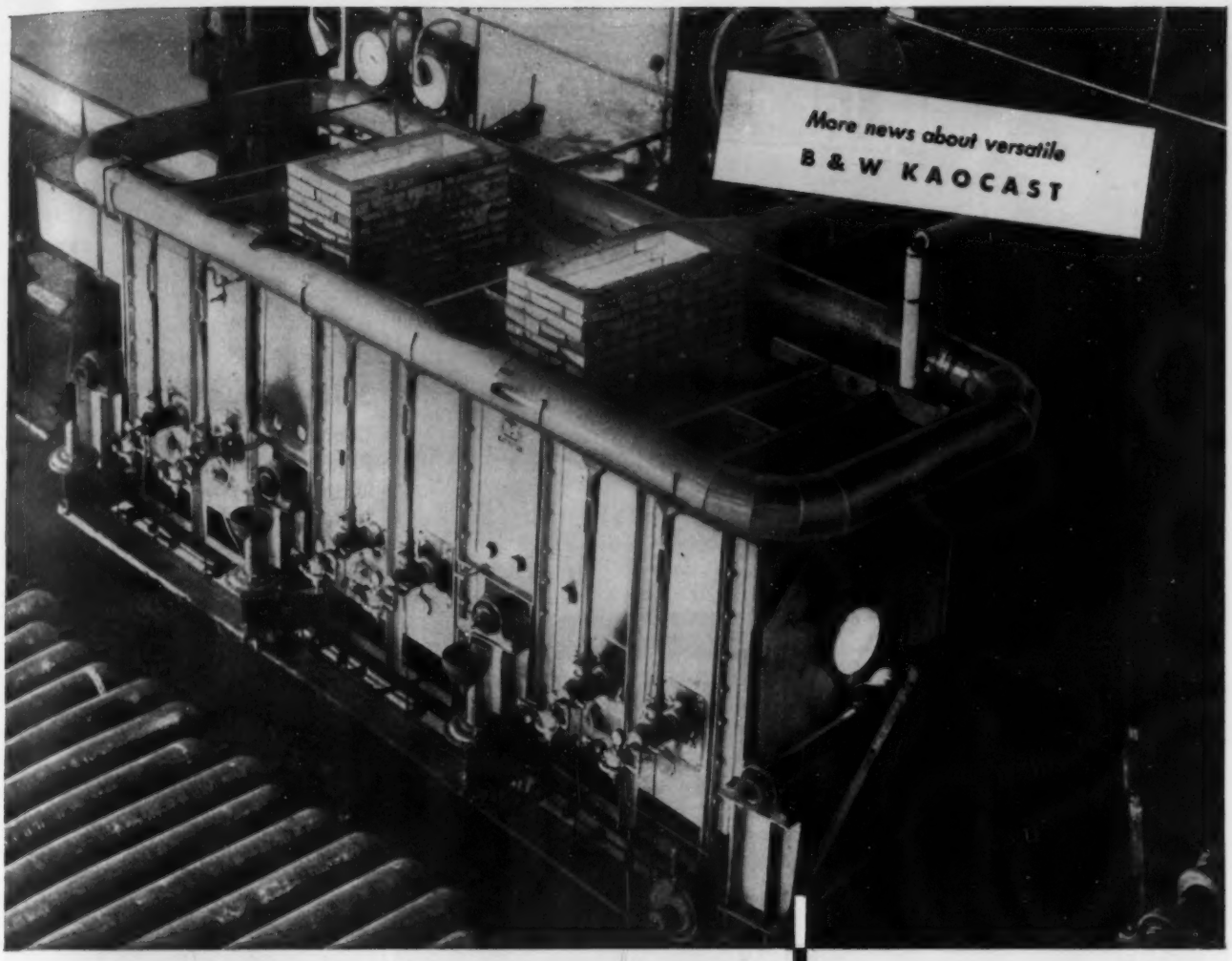


## Air control valve

Two speed controls built into the valve body of an air control valve eliminates the need for separate controls and simplifies the piping system. Savings in installations costs exceed 50 pct. The valve is made in a ⅜-in. pipe size. Models are made with control assemblies to actuate the valve by knob, lever, clevis, treadle, cam, cylinder, solenoid and diaphragm. *Valvair Corp.*

**For more data circle No. 32 on postcard, p. 103.**

***Turn Page***



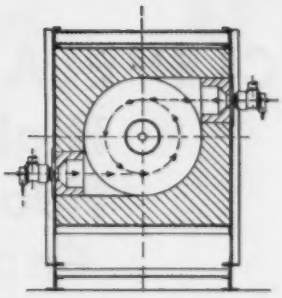

# *No maintenance for this B&W Kaocast Lining*

## AFTER 4 YEARS SERVICE

How practical is a complete castable furnace lining? This high thermal head normalizing furnace, one of the first of a new design, was lined with B&W Kaocast four years ago. Despite continuous 2500F temperatures, the Kaocast lining is still in excellent condition. Not one cent has been spent for maintenance.

This 3000 degree refractory castable performed so well because it has high resistance to spalling and slag attack, offers low volume change and practically no reheat shrinkage.

For a whole furnace lining or small special shapes, it pays to investigate versatile B&W Kaocast. It can be molded quickly by you, when you need it, directly in place or applied by cement gun. Put B&W Kaocast to work in your plant. Get all the facts from your B&W Refractories Engineer.



Cross section of R-S Products Corporation's "Hi-Head" Normalizing Furnace designed for Taylor-Wharton Iron and Steel Company, Easton, Pa.

**BABCOCK & WILCOX**

THE BABCOCK & WILCOX CO.
REFRACTORIES DIVISION
GENERAL OFFICES: 161 EAST 42nd ST., NEW YORK 17, N.Y.
WORKS: AUGUSTA, GA.

R-458

**B&W REFRACTORIES PRODUCTS**—B&W Allmul Firebrick • B&W 80 Firebrick • B&W Junior Firebrick • B&W Insulating Firebrick B&W Refractory Castables, Plastics and Mortars • OTHER B&W PRODUCTS—Stationary & Marine Boilers and Component Equipment... Chemical Recovery Units . . . Seamless & Welded Tubes . . . Pulverizers . . . Fuel Burning Equipment . . . Pressure Vessels . . . Alloy Castings

CLEVELAND *Top Quality*
High Carbon
Heat Treated
Cap Screws

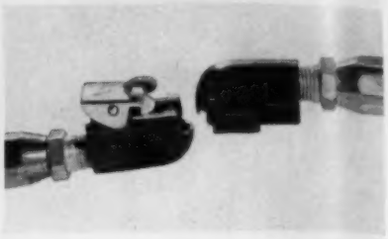
It's easy to select hex head cap screws when you know that *one type*, which costs very little more than the general run, has all the desirable qualities recommended by metallurgists and engineers. Cleveland High Carbon Heat Treated Cap Screws made by the Kaufman Process—the *Double Extrusion* method—"come through" with all the important points experts look for in correctly made fasteners.

Cleveland specializes in Cap Screws (all standard heads), Set Screws and Milled Studs, in unusually wide size ranges.

CLEVELAND *Top Quality* FASTENERS

THE CLEVELAND CAP SCREW COMPANY
2929 East 79th Street, Cleveland 4, Ohio
Warehouses: Chicago • Philadelphia • New York • Providence
originators of the Kaufman DOUBLE EXTRUSION Process
*Ask your jobber for Cleveland Fasteners*





## Slide coupling

Connection and disconnection of fluid-carrying lines by means of a simple push-pull action can be done instantaneously with a slide seal coupling. It consists of two two-piece diecast aluminum assemblies with rubber O rings. A spring-actuated locking device holds each half of the coupling in the coupled position. A press of a lock lever and a light pull separates the coupling halves. The couplings can be used for hydraulic fluids, water, hot oil, crude and fuel oils, anti-freeze solutions, gasoline and other fluids or air. *Aeroquip Corp.*

For more data circle No. 33 on postcard, p. 103.

## Band saw welder

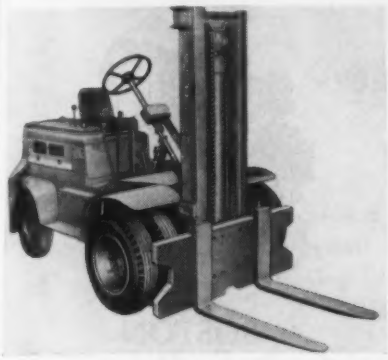
A larger capacity portable band saw blade welder is designed to butt-weld blades from 1/16 to ¾ in. It permits a wide range of work from intricate internal tool and die to power cutoff saws. A built-in grinder removes flash from the weld, and a double gage checks thickness of weld on flat saws. Welding jaws are constructed of solid copper. The unit is housed in a welded steel case. *Brennen Mfg. Co.*

For more data circle No. 34 on postcard, p. 103.

## Universal cleaner

An industrial cleaner, called Spray White, removes grease, oil, wax, gums, dirt, dye, ink, cutting soap, light carbon and other materials from metals, plastics, rubber, porcelain, concrete or wood, with complete safety. Applied with a hand-sized pressure spray gun, the new cleaner does a rapid job without heat, odor, fumes, solvents, fire hazard or danger to skin. Hard rubbing or scouring are seldom necessary. *Kelite Products, Inc.*

For more data circle No. 35 on postcard, p. 103.



## Improved fork truck

A new three-speed transmission and new fork mounting plate assembly are incorporated in an improved Yardlift 60 fork truck. Speed ratios between 1st, 2nd, and 3rd gears at gear-changing speeds are less than with two-speed transmission; result is smoother, easier shifting. The new fork mounting is approved by Industrial Truck Assn.; is designed for greater interchangeability of attachments and devices between all makes of trucks with comparable capacity. *Clark Equipment Co.*

For more data circle No. 36 on postcard, p. 103.

## Welding electrode

Designated as G-E Type W-610-A a general-purpose mild-steel welding electrode facilitates butt, fillet, lap and edge welding in all positions. Made for direct-current reverse-polarity welding, the new rod meets AWS Class E-6010 specifications. It takes high currents, is free from reaction pitting, fingernailing, spatter and blistering of coating. These features assure a high ratio of weld length to electrode used. *General Electric Co.*

For more data circle No. 37 on postcard, p. 103.

*FORD uses 102 Wheelabrators in its various plants*

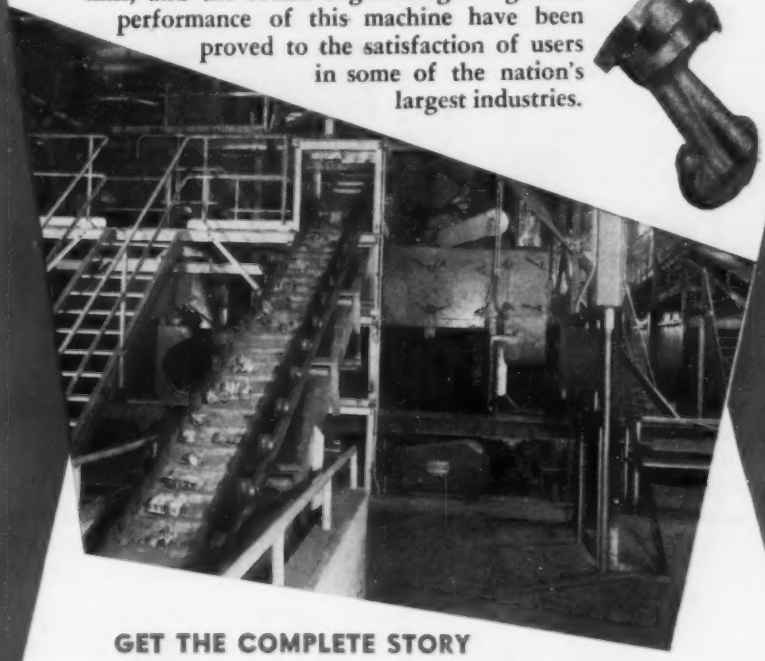
**FORD** CLEVELAND FOUNDRY

Relies on 2 Continuous Wheelabrator Tumblasts for Fast, Continuous, High Volume Cleaning

• *These machines handle a combined tonnage of 20-24 tons per hour of gray iron castings*

"Automation"—Ford's terminology for automatic, high production operations—is a cost-saving reality in the small casting cleaning department of Ford's new Cleveland foundry. Contributing importantly to this efficient operation is the high speed, low cost cleaning production effected without manual handling by two Continuous Wheelabrator Tumblasts. Cleaning speed is synchronized with the foundry's production.

American pioneered the first continuous blast mill, and the sound engineering design and performance of this machine have been proved to the satisfaction of users in some of the nation's largest industries.



**GET THE COMPLETE STORY**

Let us show you how one of these machines can be applied with cost-saving economy to your particular cleaning problem. One of our nearby field engineers will be glad to discuss this at your convenience. In the meantime, write for literature.

American WHEELABRATOR & EQUIPMENT CORP.

Wheelabrator® AIRLESS BLAST CLEANING

510 S. Byrkit St., Mishawaka, Ind.

WORLD'S LARGEST BUILDERS OF AIRLESS BLAST EQUIPMENT

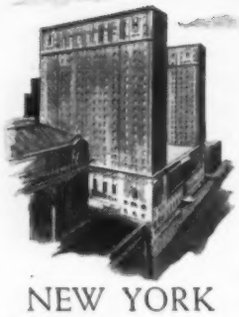
INDIVIDUALITY IS THE KEYNOTE,
at these selected

*Distinguished Hotels*

Nine distinctive interpretations of good living . . . visits made pleasant even before you arrive by the convenience of our free teletype reservation service. Each of these hotels is an undisputed leader in its city, notable for its own individual brand of hospitality and service.

WARNER DISTINGUISHED HOTELS REPRESENTED

ST. LOUIS
*Chase & Park Plaza*



NEW YORK
*Hotel Commodore*

BALTIMORE
*Lord Baltimore*

BOSTON
*Parker House*

CINCINNATI
*Netherland Plaza & Terrace Plaza*

WASHINGTON
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# SALUTES

## *Bernard F. Coggan*

**This young production specialist makes friends as fast as he unsnarls planemaking difficulties.**

IF you want production in a hurry, Sandy Coggan's your man. Early last year he walked into a production snarl at Consolidated Vultee's San Diego Div., had the assembly line humming in just 6 months.

Convair was behind schedule on assembly of the new 2-engine 340 commercial transport and T-29 Air Force navigation trainer. Output of the B-36 was also lagging. Sandy, only 34 years old, combined his own Detroit production knowledge (13 years with GM) with California's aircraft experience and boosted 340 output from five to eight per month.

He also raised the supervisory ratio from 11 to 1 to 14 to 1, released 2000 workers for other tasks, completed B-36 modification 30 days early—and lowered costs all around. Convair gave him a 5-year contract as San Diego Div. manager.

And he made friends fast. Workers were let in on company problems and goals. Convair executives and supervisors alike aired their gripes and asked questions at dinner meetings.

A native of Gary, Sandy took an E.E. degree at Michigan State in 1939. He started repairing welding equipment at Fisher Body for 50¢ per hr, in 2 years was a general supervisor at GM's Grand Rapids Stamping Div.

In 1941 he joined GM Aircraft Div. at Memphis, Tenn., later worked for GM with Boeing at Seattle on the B-29. Another stint with Fisher Body and in auto assembly plant coordination preceded his shift to Convair.

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# INTRODUCES

John F. **Ducey, Jr.**, named vice-president, AMERICAN BRAKE SHOE CO., New York, **George E. Anne**, becomes assistant vice-president; and **Daniel J. Wagner**, named district sales manager, Sales Dept., Brake Shoe & Castings Div.

A. P. **Speckin**, becomes president, U. S. DRILL HEAD CO., Cincinnati; J. R. **Bashor**, named vice-president; and W. K. **Francis** named secretary and treasurer.

John D. **Hantz**, named executive vice-president, CONTINENTAL EQUIPMENT CO.; and **Glenn G. Buzza** and **Charles A. Dally**, named vice-presidents.

A. J. **Cayia**, made vice-president and general manager, Caland Ore Co., Ltd., Canadian subsidiary of INLAND STEEL CO., Chicago.

Leroy A. **Hughes**, made a vice-president, Utilex Co., subsidiary of UNIVERSAL DIE CASTING & MFG. CORP., Saline, Mich.

Werner I. **Senger**, elected vice-president in charge of balancing, GISHOLT MACHINE CO., Madison, Wis.

A. A. **Probeck**, elected vice-president, SNAP-TITE, INC., Union City, Pa.

H. P. **Rees**, promoted to assistant vice-president, SHARON STEEL CORP.; **W. J. McGaffney**, appointed general works manager, Lowellville Works; and **Henry Evans** becomes general works manager, Roemer Works.

R. L. **Hanes**, appointed assistant to the vice-president in charge of sales, THE COLORADO FUEL & IRON CORP.

Karl S. **Howard**, appointed assistant vice-president, Foundry Div., CANADIAN CAR & FOUNDRY CO., LTD., Montreal.

**Bert O. Brand**, elected a director of VANADIUM CORP. OF AMERICA.

C. C. **Hurlburt**, becomes director of engineering, KLINCHER LOCKNUT CORP., Indianapolis.

**William F. Langefeld**, appointed director of purchases, THE MAYTAG CO., Newton, Iowa.

**Robert H. Allgood**, appointed director of public relations, DETREX CORP. of Detroit.

**Roy O. Johnson**, appointed metallurgist, THE HYDRAULIC PRESS MFG. CO., Mount Gilead, Ohio, and **Charles W. Eastman**, named industrial engineer.

**William C. Davidson**, appointed abrasive engineer, West Virginia territory, NORTON CO., Worcester.

**A. F. Wiest**, placed in charge of all manufacturing operations, Alloy Tube Div., Union, N. J. for CARPENTER STEEL CO.

**Lou R. Gallas**, appointed sales engineer for electropolishing processes and installations, ELECTRO-GLO CO., Chicago.

**Frank R. Romeo**, appointed superintendent, Roll Hardening Dept., THE MIDVALE CO., Nicetown, Pa.

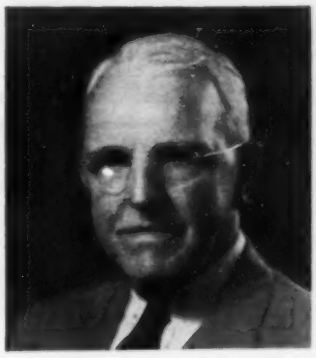
**Walter J. Kallmyer**, appointed chief engineer, STANDARD STEEL CORP., Los Angeles.

**L. G. Bygrave**, appointed manager of sales, Craine-Schrage Steel Div., DETROIT STEEL CORP., Detroit.

**J. P. Coughlin**, appointed manager, Arc Welding Dept., WESTINGHOUSE ELECTRIC CORP., Pittsburgh.

**David A. Kuniholm**, appointed manager, Special Products Div., in addition to his duties as manager of the Industrial Roll Div., RODNEY HUNT MACHINE CO., Orange, Mass.

BYRON L. FOSTER, elected president, L. B. Foster Co., Pittsburgh.



JOHN R. FREEMAN, JR., appointed vice-president of metallurgy and research, The American Brass Co., Waterbury, Conn.

E. W. RISTAU, appointed vice-president in charge of sales, Power Tool Div., Rockwell Mfg. Co., Pittsburgh.

## Personnel

*Continued*

**Fred B. Shew,** named sales manager, Bucket Dept., THE WELLMAN ENGINEERING CO., Cleveland.

**Russel L. Gergen,** appointed sales manager, The Gage Div., THE PIPE MACHINERY CO., Cleveland.

**William C. Ridge,** appointed works manager in charge of manufacturing operations of the Trenton and Roebling, N. J. plants, JOHN A. ROEBLING'S SONS CORP.

**E. W. Hoster, Jr.,** named district sales manager in Columbus; JONES & LAUGHLIN STEEL CORP.; and **F. A. Haynes,** named district sales manager, Louisville.

**Duanne R. Lamiman,** named district sales manager, New York office, U. S. Gauge, Div. of AMERICAN MACHINE & METALS, INC., Sellersville, Pa.

**Raymond C. Gintert,** returns as district manager, Warren, Ohio, REPUBLIC STEEL CORP.

**Harold F. Fulton,** joins New York State staff, WYANDOTTE CHEMICALS CORP. in Buffalo.

**A. B. Fisher, Jr.,** named assistant general manager, Engineering and Construction Div., KOPPERS CO., INC., Pittsburgh; and **G. P. Wilson, Jr.,** will becom manager of control, same division.

**Wyman K. Ender,** joins products engineering department, THE TRANE CO., La Crosse, Wis.

**Elliot Schiek,** joins engineering staff of EBERT ELECTRONICS CO., Hollis, N. Y.

**John P. Sweeney,** appointed district manager, FIRTH STERLING INC.; and **Munro J. Mann,** becomes assistant district manager, Detroit branch.

**John D. MacNamara,** named field sales manager, BECKMAN INSTRUMENTS INC., South Pasadena, Calif.

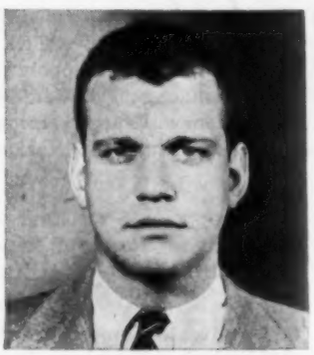
**Edward N. Ryan,** appointed assistant manager, New York branch sales office, CRUCIBLE STEEL CO. OF AMERICA, Pittsburgh.

**Hal Ernst,** appointed sales manager, Hydraulic Control Div., BLACKHAWK MFG. CO., Milwaukee.

R. LESLIE MULLEN, made assistant to the president, Lehigh Structural Steel Co., Allentown, Pa.

WILLIAM R. LOCKRIDGE, named director of market development, The New York Air Brake Co., New York.

JOHN S. GATES, elected treasurer, Foote Mineral Co., Philadelphia.



RICHARD M. SCAIFE, elected a member of the board of directors, Scaife Co., Pittsburgh.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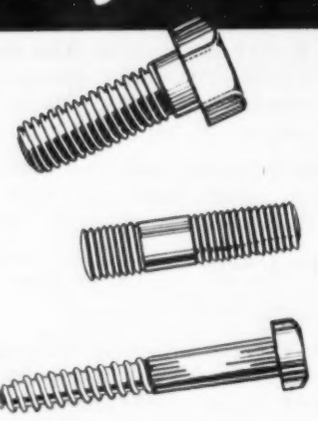

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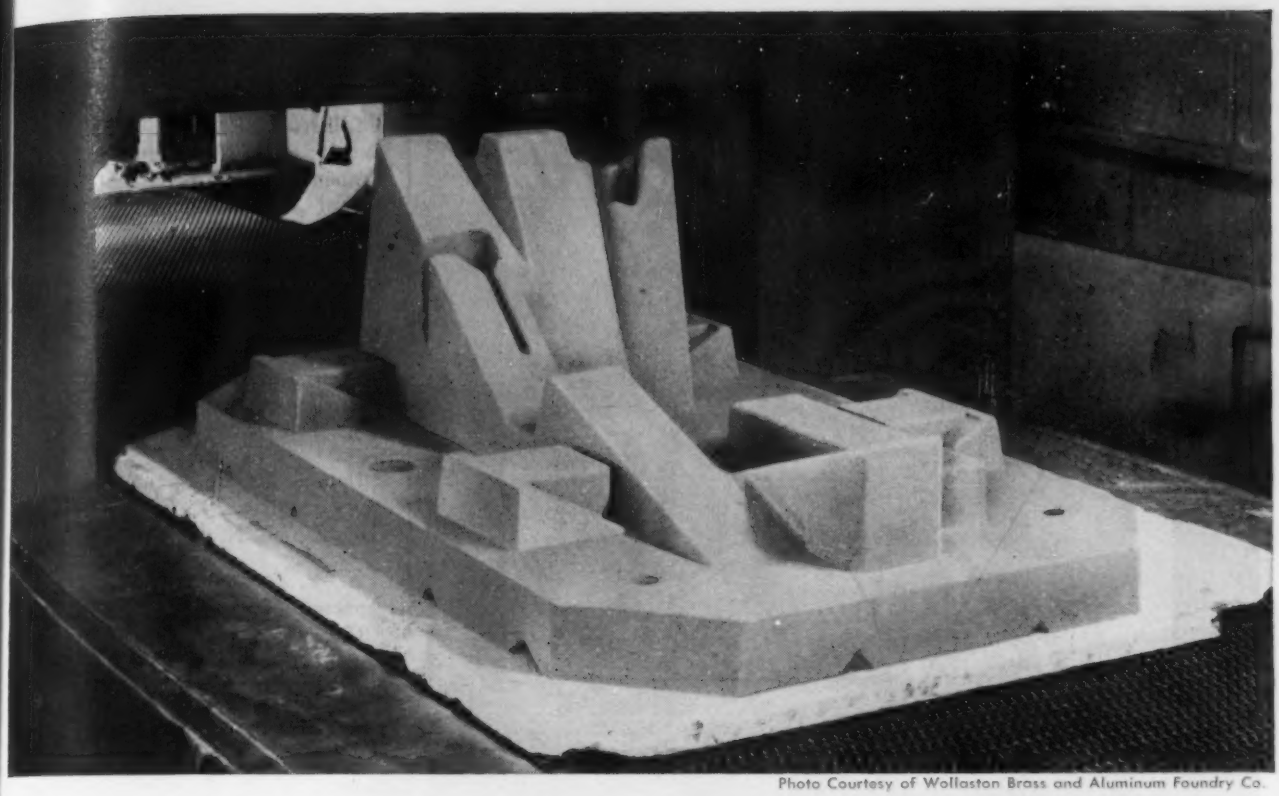

Photo Courtesy of Wollaston Brass and Aluminum Foundry Co.

# New odor-free urea core binding resin

## Monsanto's Resimene 970 cuts baking time up to 40 percent, compared to oil-bonded cores...

To its long list of research-built resins serving the foundry industry, Monsanto now adds Resimene 970—a new urea formaldehyde core binder that eliminates odor at the muller and core making station, and produces better baked cores in 40 percent less time.

Resimene 970 produces unusually accurate cores with sharp edges and no loose sand grains to rub off. Cores have greater over-all strength to withstand rough handling; reduce core scrap.

More than this, Resimene 970 eliminates shakeout problems and fissures . . . means less gas, greatly improved water resistance, less oven maintenance, and fewer scrap castings. Also, with Resimene 970 an underbaked core is a rarity.

If your problem is to eliminate unpleasant odors at the muller or core making station – or a production bottleneck – Resimene 970 can solve it. Why not send for full information today? The coupon is for your convenience.

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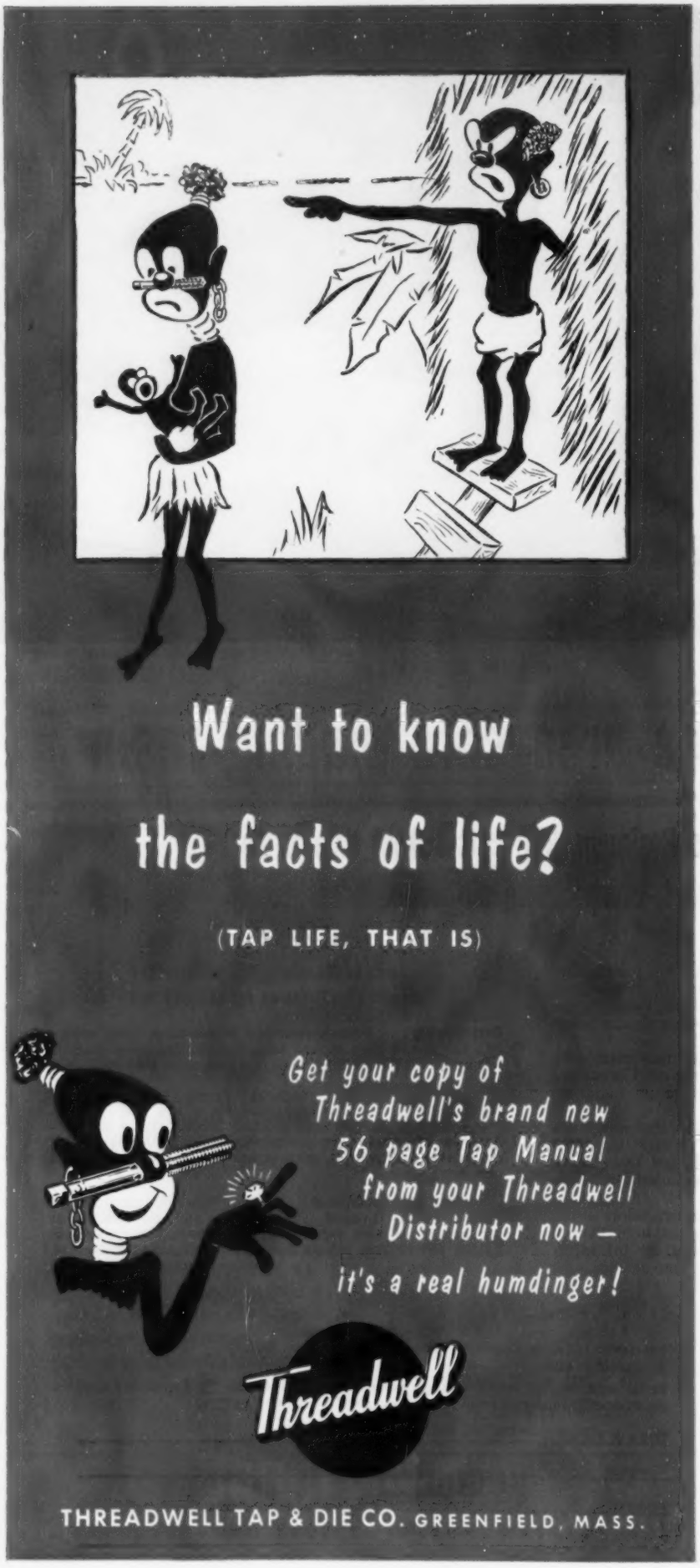



## —Personnel—

*Continued*

**Gilbert J. Schuelke,** appointed assistant sales manager, Chain & Transmission Div., CHAIN BELT CO. of Milwaukee.

**Bryan Rudder,** appointed a direct salesman for the Philadelphia office, A. P. GREEN FIRE BRICK CO., Mexico, Mo.

**F. F. House,** appointed sales manager, Philadelphia territory, MUELLER BRASS CO., Port Huron, Mich.

**Donald A. Hanan,** appointed sales representative, PETERSON STEELS, INC., Union, N. J.

**A. F. Petan,** promoted to sales representative, PORCELAIN METAL PRODUCTS CO., Carnegie, Pa.

**Price Davis,** appointed manufacturers' representative in Wisconsin, HORTON CHUCK, division of The E. Horton & Son Co., Windsor Locks, Conn.

**Jim P. Kay,** appointed central western representative, H. H. BUGGIE & CO., Toledo.

**Gifford Kittredge,** appointed New York Regional manager, LAMSON CORP., Syracuse.

**R. J. Sprott,** named assistant production manager, Engineering & Construction Div., KOPPERS CO., INC., Pittsburgh; **C. S. Carden,** named chief engineer; **A. D. L. Orefice,** named assistant chief engineer; and **C. G. Barnett,** becomes manager, By-product section, Engineering & Construction Div.'s, Engineering Dept.

**Gilbert B. Valentine,** appointed sales manager, Technical Processes for Promat Div., POOR & CO., Waukegan, Ill.

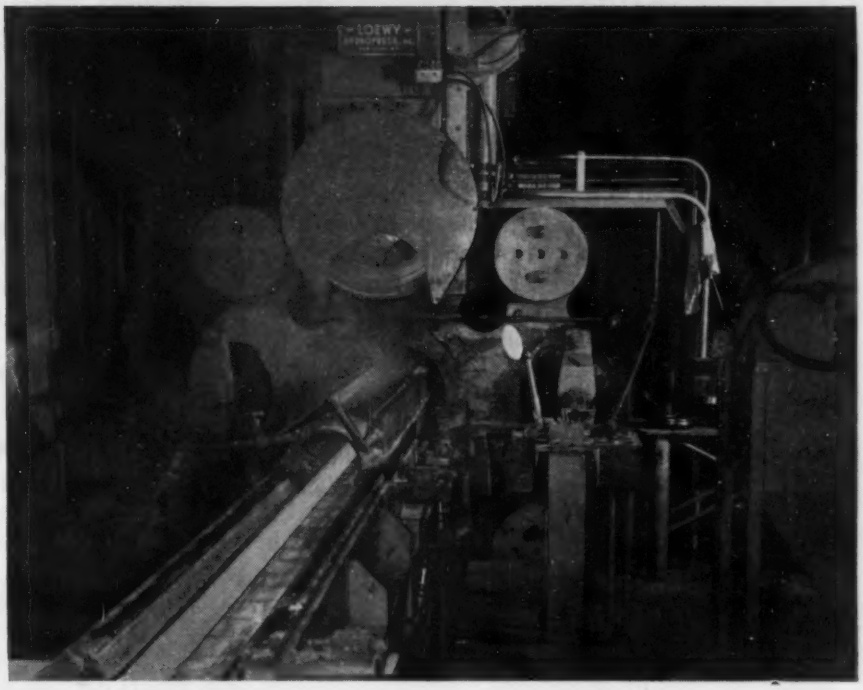
**Raymond P. Logan,** elected to membership in the CONTROLLERS INSTITUTE, New York.

**Frank Komerska,** appointed Detroit plant manager, AINSWORTH MFG. CORP.

### OBITUARIES

**A. N. Goddard,** 80, founder and chairman of the board of Goddard & Goddard Co., Detroit, recently in Key West, Fla.

**Lewis E. Spear,** 86, president of Pacific Wire Rope Co., Los Angeles, recently at his home in Santa Barbara, Calif.



# How National Tube HOT EXTRUDES Stainless Steel Tubing

By D. I. Brown
Technical Editor

◆ Seamless stainless steel tubes 1½ to 3½ in. in diam and 20 to 40 ft long are being hot extruded at the Gary Works of National Tube . . . Ugine-Sejournet process is used . . . Several grades of stainless are extruded.

◆ Materials handling in the new installation has been carefully planned . . . Monorail conveyer and other handling mechanisms move billets through furnaces to the extrusion press.

◆ Major equipment includes extrusion press, heating furnace and salt bath furnaces . . . Billets are cold sawed from hot-rolled and turned bars . . . Depending on size, billets are lathe drilled or pierced on the extrusion press.

◆ HOT EXTRUSION of stainless tubes has been underway since last September in the Gary Works of the National Tube Div., United States Steel Corp. Seamless tubes 1½ to 3½ in. in diam and 20 to 40 ft in length have been produced in various grades of stainless steel, table p. 132, using the Ugine-Sejournet process. Present plans call for future use of the equipment to produce both regular and irregular shapes.

So far production rates are as high as 40 extrusions per hour. Officials expect even higher production as more experience is gained with the process and equipment. Tube tolerances, wall thickness, eccentricity, outside diameter and run-out are held to regular seamless tube standards.

First step in making the extruded product is preparation of the billets. Billet stock is cold sawed from hot-rolled and turned bars. Billets

***Most of the tubes have been made from drilled billets. Tubes over 3½ in. OD can be pierced and extruded from solid billets.***

can vary from 5¾ to 8 in. in diam and from 9 to 28 in. in length. Bars 7 in. in diam have been used in greatest tonnage to date. National Tube has four container sizes for its press: 6 in., 6⅝ in., 7¼ in. and 8⅜ in. For the 7¼ in. container, the 7 in. diam round turned to a tolerance of plus zero, minus 0.040 in. is used.

Front outside edge of the billet is chamfered on a lathe. The chamfer prevents undesirable corner cooling. The back edge is not chamfered. The billet is then taken to the drilling machine. Holes smaller than 2 in. in diam are drilled through the length of the billet. Larger holes can be pierced on the press. In the drilling operation the drill remains stationary and the billet turns.

After the center hole is drilled, the billets move to the arcwelding machine shown in Fig. 1. Here a flux-filled stud is welded to one end of the billet. This stud permits the billet to be hung on a special type monorail conveyer system which takes the billet through the heating furnace and salt baths to the feeding table of the Loewy Hydropress extrusion press.

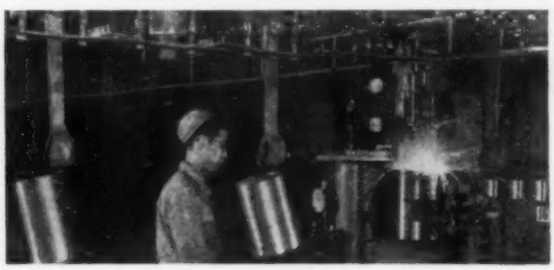


FIG. 1—Carbon steel studs are electric arcwelded to the drilled billet. Semiautomatic Nelson studwelding equipment and the flux-filled studs, which Nelson Stud Welding Div., Morton Industries Inc. developed, eliminated the need for costly carriers.

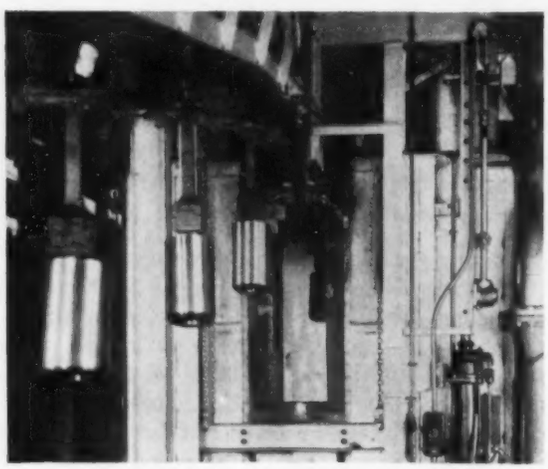


FIG. 2—Cold billets enter Selas vertical furnace which is fired with coke-oven gas.

The entire conveyer line indexes one station forward each time a billet moves out of the furnace. The cold billets enter the three-zone, 55-ft long Selas Furnace, Fig. 2. A top shoe on each conveyer arm rides on a water-cooled pipe on top of the furnace. Thus only the billet and suspended hook bar, made of 25-12 stainless, are exposed to heat as the shoe riding on the water-cooled pipe track effects a furnace seal, Fig. 3.

The special vertical furnace, Fig. 2, is fired by coke-oven gas. The first heating zone is kept at 2300°F, the second at 2250°F and the last zone is heated to 2200°F. Fully automatic control of heat input and temperature measurement is built into this unit.

### Gas and salt heating used

Ordinarily it takes the billets less than 1 hr to travel through this heating furnace. The billets come out of the heating furnace and are immediately charged into one of the two salt-bath furnaces. An ingenious mechanism lowers the billets into these furnaces which are set at 2300°F. Here, final heat is imparted to the billets which can be held in these furnaces for about 30 min. A longer holding time in the molten barium chloride salt bath is restricted by the strength of the stud. Each furnace holds 8000 lb of salt.

The billets are moved through these furnaces

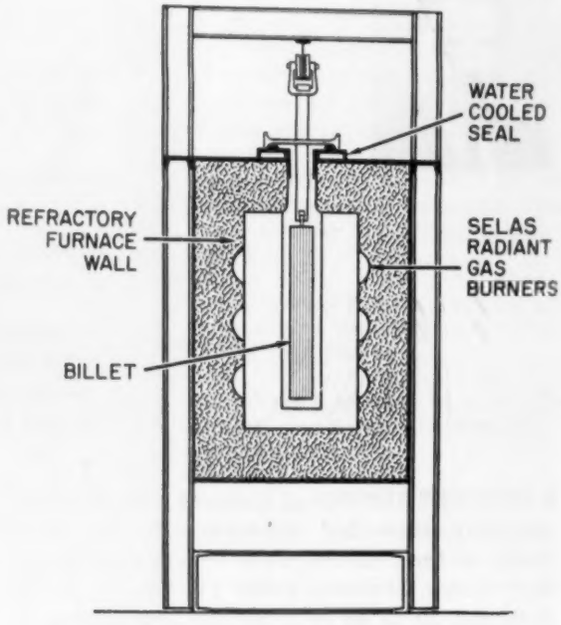
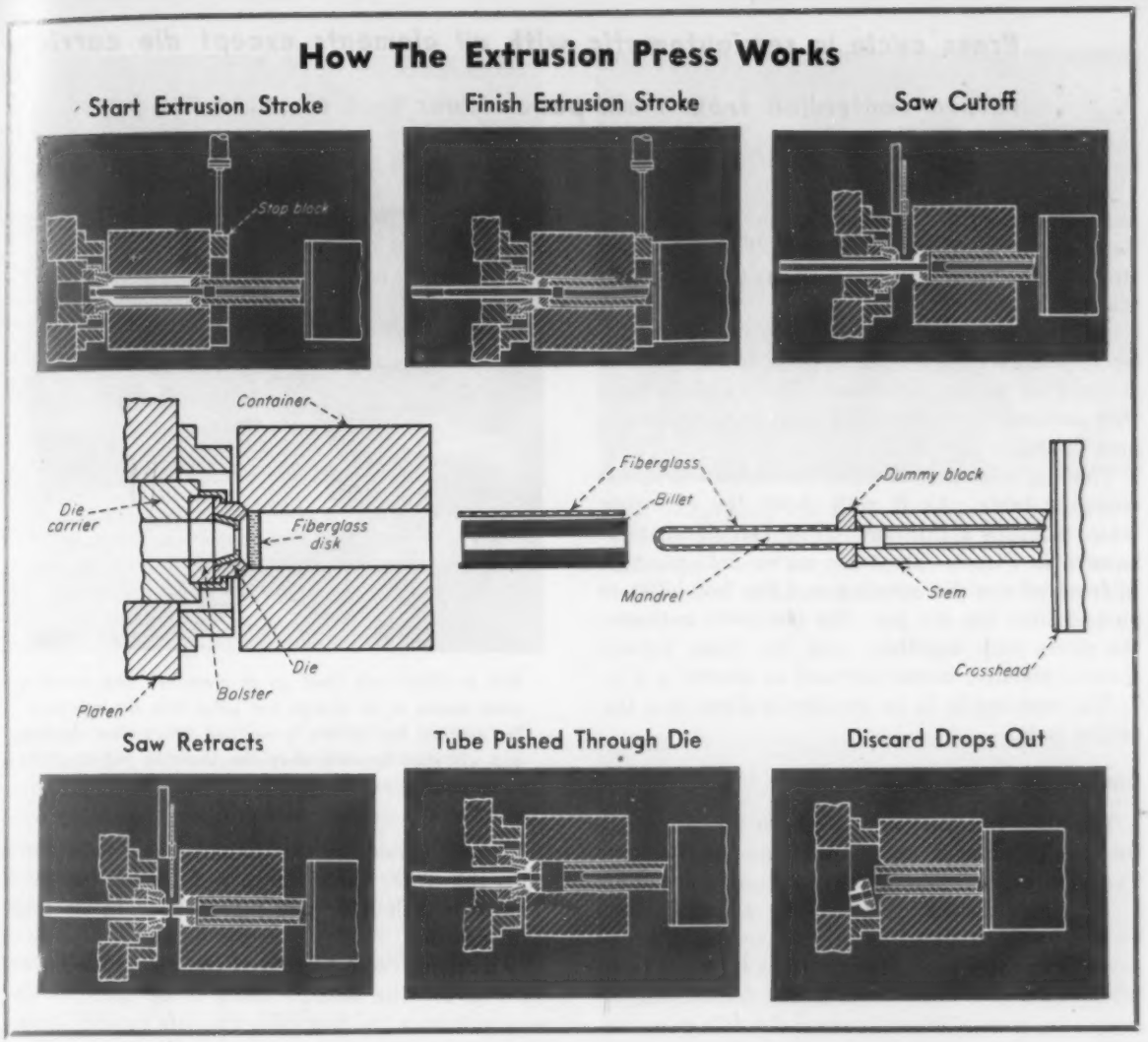



FIG. 3—Schematic cross-section of the top of the Selas heating furnace. Steel shoe rides against water-cooled plate track mounted on top of the furnace to effect a seal. Hook bar is made of stainless steel.



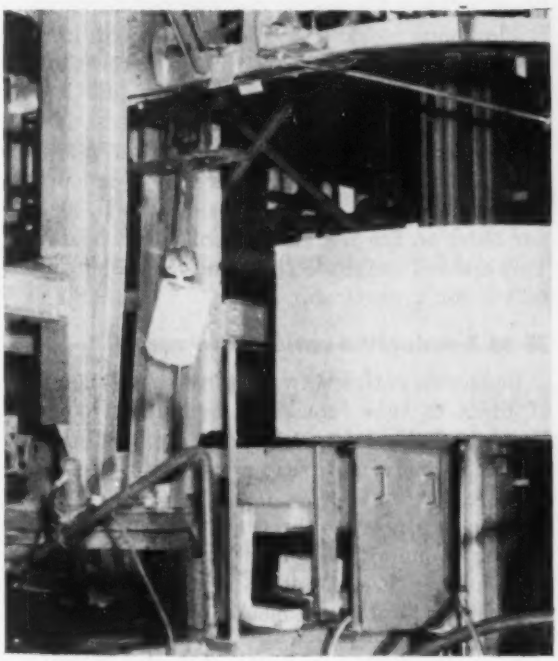



FIG. 4—Heated billet is lifted out of a Holden salt bath furnace. Overhead conveyer delivers this billet to the discharge chute. Salt layer on billet prevents scaling. Next stop is the receiving station, Fig. 5.

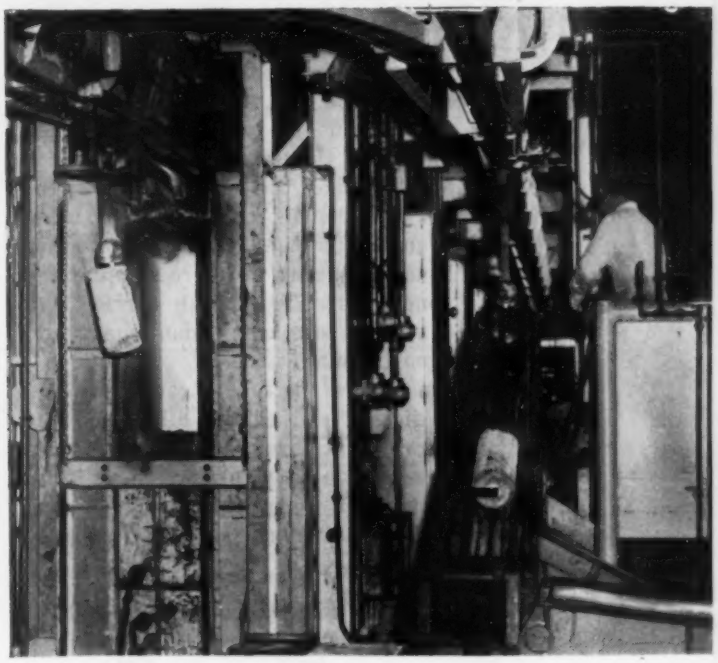


FIG. 5—Operator cuts off stud and billet slides down chute. Glass veil can be seen on charging table, lower right. At left, a billet leaves gas furnace on way to a salt bath furnace.

***Press cycle is semiautomatic with all elements except die carriage return controlled from main panel. Four men operate the press.***

and elevated to the conveyer as shown in Fig. 4. Some salt dragout is experienced. The salt which clings to the billet prevents further oxidation and scaling however.

As the conveyer delivers the scale-free billet to the receiving station, Fig. 5, the stud is sheared off by an air chisel. The stainless hook then returns to the welding station to receive a new billet.

The hot billet falls down to the extrusion press-charging table. As it rolls down the charging table, it wraps a thin spun-glass veil about itself as seen in Fig. 6. The table moves into position in front of the die opening and the hot billet is pushed into the die pot. As the table retracts, the press ram together with the glass fabric-covered mandrel moves forward as shown in Fig. 7. The mandrel is ¼ in. smaller in diam than the drilled hole.

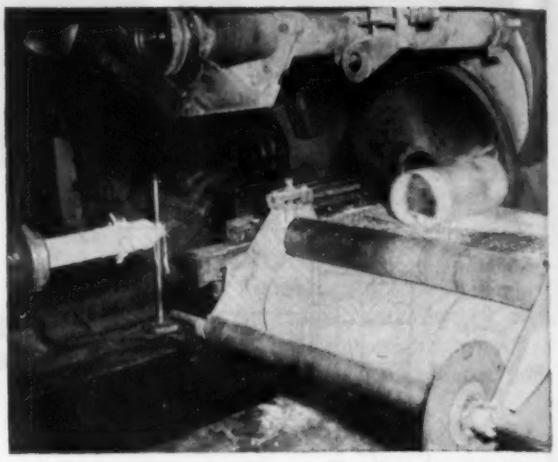


FIG. 6—Billet rolls itself up in glass veil and charging table moves in to charge hot billet into die container. The mandrel bar, at left, is wrapped with a glass stocking and will start forward when the charging table returns to its original position.

### Die changed for each tube

The main ram carries a 2000-ton force against the hot billet at a speed maximum of 30 ipm. The tube exits from the other side at a speed 25 to 50 times the ram speed. The mandrel ram, backed by 500 tons of additional hydraulic pressure, is usually used along with the main ram. When making a tube with an inside diameter of over 2 in. a solid billet is used. In this case the piercer cylinder acts independently during the piercing operation and additively to the main ram while making the extrusion.

At the end of the extrusion stroke the container retracts enough for the hot saw to come down between the die and the front end of the container and cut off the tube. The ram then advances and pushes the tube free of the die. A delivery table then takes the tube down the mills.

Between pushes the die is changed, mandrel is cooled as shown in Fig. 8 and the container cavity is cleaned by a wire brush rotating at the end of a long shaft. The brush carrier and dummy block mechanisms are semiautomatic and controlled from the main panel.

As the ram pushes the tube through the die, the butt or discard end of the billet, and the dummy block which fits over the end of the ram, fall to a conveyer which returns them to floor level close to the main control panel. The discard is squeezed off the dummy block in a special hydraulic press and the dummy block rolls down into the water tank where it is picked up by a mechanical elevator and placed back in its original position.

An etched cross-section of the discard is shown in Fig. 9. The dummy block is designed to encourage metal to flow back over its outside diameter. Note the flash at bottom of Fig. 9. This metal flow is aided by channels cut in the dummy block. The flash keeps the discard fastened to the dummy block and allows the container to pull back and provides clearance for the hot saw during the cut off.

Circular spacer rings which can be seen in Fig. 8 are used between the container and the main ram. These permit control over how much butt or discard is left in the press. Average discard per billet on the 7-in. diam rounds has been 7 lb. This discard weight is the same for all lengths of billets for a particular size.

### 35 to 1 reduction ratio preferred

Reduction ratios between the cross-section area of billet to tube have run as high as 50 to 1. However, ratios of about 35 to 1 are preferred as higher ratios mean greater wear on the mandrel and die, etc.

Four men operate the press; one at the charging table, one at the control panel, one to handle the die change and one to separate the discard butt from the dummy block and handle lubrication materials. The man at the control panel operates all the equipment except the die carriage which is on the delivery side of the press. After leaving the press the tube is conveyed on a roller-table past the hot saw, and from there

**TYPES OF STEEL HOT EXTRUDED**

| Austenitic | Ferritic | Miscl. |
|---|---|---|
| 303 321<br>304 347<br>310 | 410<br>416 | 1½ Cr-½ Mo |

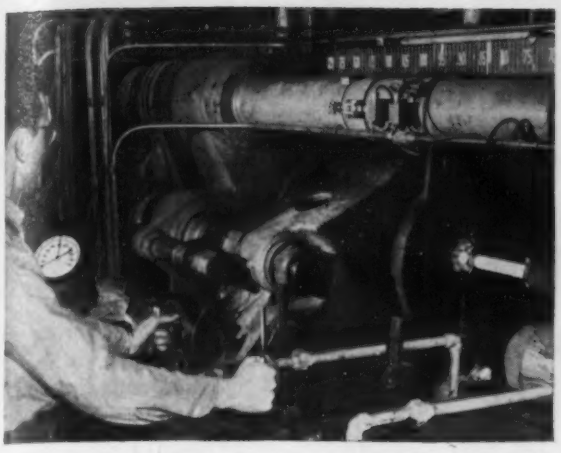


FIG. 7—Press operator positions glass stocking-covered mandrel so that it will enter hole in billet resting in container. At this stage, spacer rings are in position in front of container to halt forward motion of the ram. Rings are power operated.

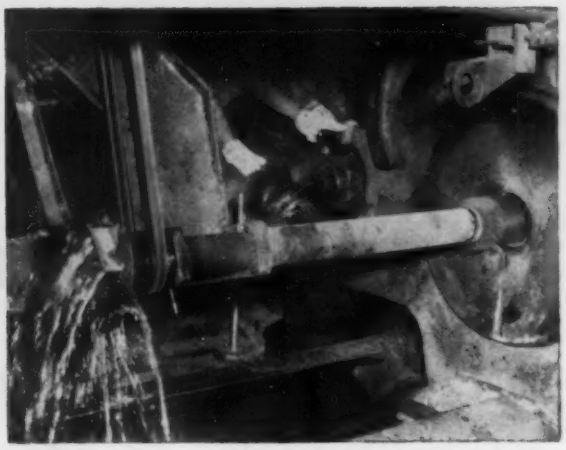


FIG. 8—Revolving wire brush moves out of cavity after cleaning liner walls. The mandrel bar is pulled back and given a water bath inside the mandrel ram to cool it. Ram travel spacer rings can be seen in raised (open) position at the upper right.

into a quenching tank. Austenitic grades of stainless are immediately water quenched.

So far National Tube has been concentrating production on medium-size tubing. The sizes made range from 1½ to 3½ in. OD in wall thicknesses of 0.134 in., 0.165 in. and some 5/16-in. wall tubes. Although the press is capable of extruding 80-ft lengths, billet size has been restricted so that most lengths made to date run between 20 and 40 ft.

Die wear is not the problem that breakage is because worn dies can be redressed and used for other tube sizes.

Buildup on the die is usually an indication of proper lubrication and die setup. This buildup is composed of salt scale and glass and is chipped off the die face quite easily.

The same type of surface layer exists on the outside and inside surface of the extruded tube. This coating is thin and tenacious. A fluoride-type pickle bath has been used with good results to clean the tubes before they are sent to the tube reducers or draw benches for final cold reduction.

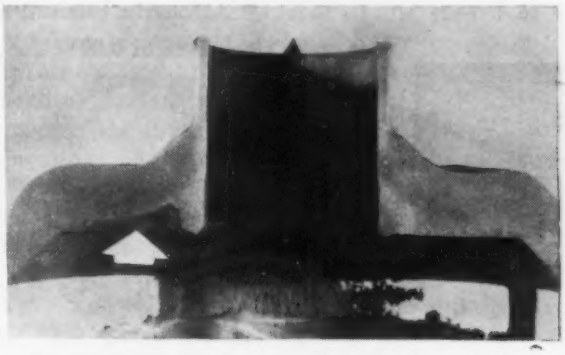


FIG. 9—Etched cross-section of discard shows flash at bottom. Arrow points to the carbon steel stud tip which does not end up in tube but in discard part of billet. Flash holds dummy block to discard.

As the process is developed further and the most suitable die steel and glass lubrication is determined, plans call for extrusion of smaller and thinner wall tubes along with intricate steel shapes.

## BACKGROUND

Although research on the hot extrusion of ferrous metals has been going on for over 30 years it was not until 1940 that real progress started. In that year a French company, Comptoir Industriel d'Etirage et Profilage de Metaux, Paris, organized a research project that culminated in a steel extrusion process that proved commercial. This plant was built at Persan, France, and started operations in Jan. 1949.

The biggest single hurdle to successful steel extrusion had been the lack of a satisfactory lubricant. The French overcame this problem by the use of glass. Since that time a number of American companies have been licensed to use the process. These licensees include: Allegheny Ludlum Steel Co., Babcock & Wilcox Co., Tubular Products Div.; International Nickel Co.; Jones & Laughlin Steel Corp.; National Tube and others. The French are concentrating on shapes while we are working mostly on tubing.

# BRUSHES:
# Production Tools for GOOD SURFACE FINISHES

- Brushing can remove burrs, slivers and other surface imperfections without appreciably changing the shape or dimensions of a part . . . Brush flexibility permits controlled blending of surface irregularities.
- Surfaces having an original finish of 24 to 35 microinches can be brushed to a finish of 4 to 7 microinches . . . Finish may appear duller than a buffed or polished surface . . . It does not hide defects.
- Automatic brushing can finish 1000 to 2000 parts per hr . . . Materials cost is as little as 0.001¢ per processed part.

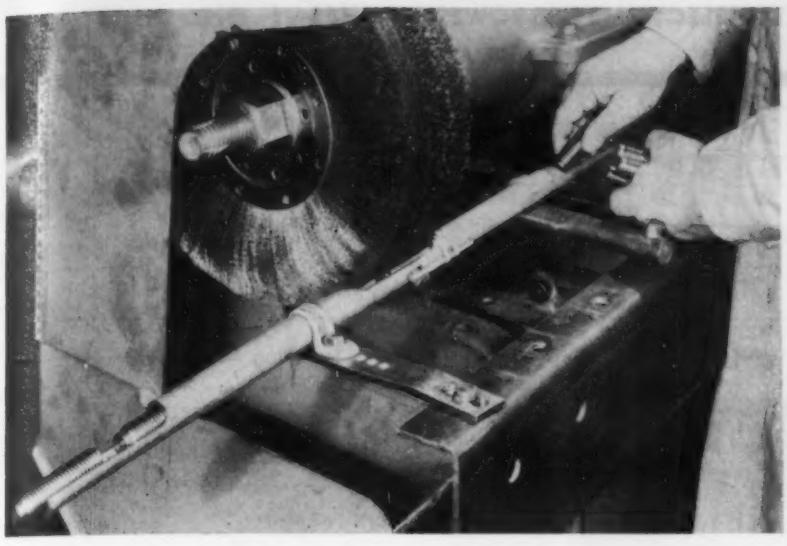
By R. O. Peterson
Manager
Technical Dept.
Osborne Mfg. Co.
Cleveland

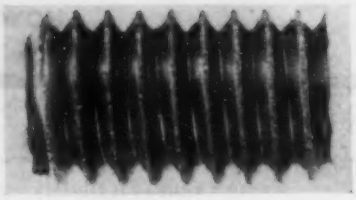
◆ BRUSHES ARE TOOLS for many jobs, including conditioning of surfaces to specific characteristics. They can remove burrs, slivers and lightly attached particles, finish edges by blending the junctures into smooth curves, remove surface films and encrustations, impart major characteristics to surfaces or move materials from or along the surface. They are not intended to remove appreciable quantities of a surface to achieve dimensional size. A major advantage of brushing is the extremely wide range of mechanization possible.

Metal surfaces requiring finishes less than 30 microinches rms usually require the use of one group of brushes. Another group is used when finishes are to exceed 30 microinches. Further selection of the correct brush involves three major brush characteristics: (1) flexibility, (2) finishing ability and (3) brushing action strength.

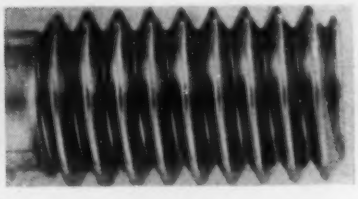
Use of the chart on the third page of this article will help to select a brush of high or low flexibility, and to determine for fast or slow brushing action. The first brush selected may not be the most efficient for a particular job. Six categories of adjustments listed at

COMPARISON OF GEARS before (below) and after (above) brushing. Burrs and sharp edges are removed in 18 sec, including handling time. No secondary burrs or sharp edges are created by brushing.





POWER BRUSH removes sharp edges and improves surface finish of threads without changing their shape. Brushing is done by stove-pipe method.



the bottom of the chart suggest means to overcome difficulties.

Brush construction is an important factor in its selection. Three general types of construction are used for industrial brushes: (1) helical, (2) strip, and (3) sectional. Helical construction is suited for brushes requiring wide faces such as those used for finishing or scrubbing strip steel. Brushes of strip construction also have wide faces but are characterized by low fill density. These brushes are used for cleaning conveyer belts and mechanical floor sweeping. The main feature of sectional brushes is that the face width of a brush can be built up to various increments.

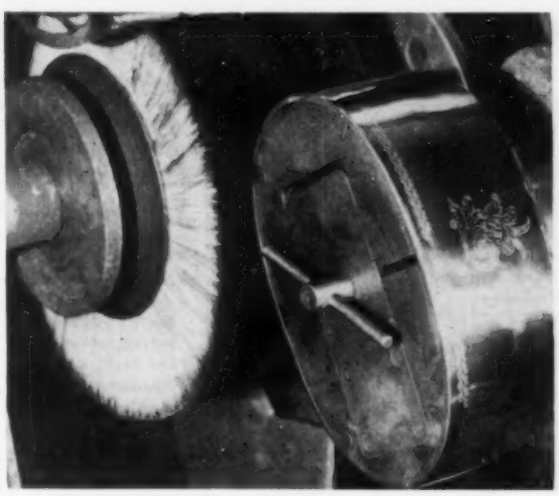
Ability of a brush to withstand working stresses depends on such parts as the retaining member. Loss of brush material due to slippage or pulling out is encountered only in a poorly made brush. The back or hub of a well made brush is accurately formed to permit the use of sections side by side. Sections should readily fit a standard arbor, although adaptors or flanges are sometimes used for the purpose.

Cooling by ventilation is often a requirement for nonmetallic brushes. This is particularly so when the brush face is 3 in. or more and the work cycle is continuous. Air vents in the hubs facilitate air flow and reduce or eliminate scorching and burning. Brush material, acting as a fan, throws out air from between the filaments and causes more air to be drawn through the vents. Nonmetallic fill brushes should not exceed a temperature of 130°F, otherwise brush life will be greatly reduced.

Flexibility of a brush enables it to conform to the contour of a workpiece. By comparison, abrasive belts and wheels tend to work on the high spots. For this reason, a brush blends the edges of surface irregularities into smooth curve junctures. It also disperses stresses which concentrate at sharp edges. Power-driven brushes have helped to solve many problems of stress distribution by avoiding local stress concentration and progressive fracture.

Bolts and studs often rupture after being subjected to repetition of a tensile load. Failures starting at the root of the thread or at a scratch produced by a burr spread inwardly. Removal of sharp edges and improvement of surface finish, without changing the shape of the threads or removing a measurable amount of metal, spreads the stresses and aids in overcoming a major thread finishing problem. Removal of burrs also helps to equalize load distribution.

Another example of effective power brushing is the removal of excess rubber from a pin used for tank tracks treads. Special cutters can be used economically, but by brushing the pins, surfaces resist the formation and spreading of microscopic cracks which cause rupture through fatigue. Cutting tools, regardless of speeds and feeds used, produce marks and fragment



BRUSHING BLENDS IMPERFECTIONS of a surface so that a good plating job can be done. Flexibility of brush enables curved surfaces to be finished easily. The design on the shell is unblurred by brushing.

## HOW TO SELECT AND USE POWER BRUSHES

| For Jobs Requiring Surface Finish Less Than 30 Microinches rms | | | For Jobs Which Permit or Require Surface Finish Exceeding 30 Microinches rms* | | |
|---|---|---|---|---|---|
| Brush Flexibility: Medium → High | | | Brush Flexibility: Low → High | | |
| Brush Finishing Ability: Very Fine (Low rms) → Medium | | | Brush Finishing Ability: Fine → Coarse | | |
| Brushing Action: Medium → Very Fast | | | Brushing Action: Medium Fast → Medium → Fast | | |
| Cord & Fabric Brushes | Tampico & Treated Tampico Brushes | Fine Wire Sections Used With Burring Compound | Wire Wheels | Wire Sections | Coiled Knot Sections |
| **Major Brush Characteristics** | | | | | |
| Fast cutting medium flexible wheels. Used with cut and color buffing compounds for producing low microinch finishes | Flexible, fast cutting wheels. Used with burring compounds of tacky composition for producing surface finishes of approx. 8 to 10 microinches rms | For efficient use of wire brushes with compound, select brushes having medium or high density and fine wire size (0.008 diam or finer) | Wide face, dense fill. Used where fast cutting and fine finishes are required. Best general purpose wire brush | Narrow face, medium density. Used where medium brush flexibility is essential to follow contoured surfaces | Narrow face, low density. Used where a high degree of brush flexibility is needed and where surface impact action is necessary, especially to remove surface encrustations |
| **Major Applications in Order of General Usage** | | | | | |
| 1. Cut and color buffing<br>2. Surface blending<br>3. Light scale removal<br>4. Producing radii<br>5. Burr removal | 1. Burr (small) removal<br>2. Producing radii<br>3. Light scale removal<br>4. Surface blending<br>5. Cleaning<br>6. Satin finishing | 1. Burr (medium) removal<br>2. Light scale removal<br>3. Satin finishing<br>4. Producing radii | 1. Burr (heavy) removal<br>2. Producing radii<br>3. Rust and oxide removal<br>4. Scale removal<br>5. Cleaning<br>6. Surface blending | 1. Cleaning<br>2. Medium scale removal<br>3. Rust and oxide removal<br>4. Satin finishing<br>5. Surface blending<br>6. Burr removal | 1. Heavy scale removal<br>2. Rust and oxide removal<br>3. Satin finishing<br>4. Producing radii<br>5. Burr removal (on very hard metals) |
| **Adjustments For Desired Results** | | | | | |
| Brush works too slowly | Brush works too fast | Action of brush peens burr to adjacent surface | Finer or smoother finish required | Finish too smooth and lustrous | Brushing action not sufficiently uniform |
| 1. Increase surface speed by increasing OD or rpm<br>2. Decrease trim length and increase fill density<br>3. Increase filament diam | 1. Reduce surface speed by reducing rpm or OD<br>2. Reduce filament diam<br>3. Reduce fill density<br>4. Increase trim length | 1. Decrease trim length and increase fill density<br>2. If wire brush tests indicate metal too ductile (burr is peened rather than removed), change to nonmetallic brush such as a treated Tampico used with burring compound | 1. Decrease trim length and increase fill density<br>2. Decrease wire diam<br>3. Try treated Tampico or cord brushes with suitable compounds at recommended speeds<br>4. Use auxiliary buffing compound with brush | 1. Increase trim length<br>2. Reduce brush fill density<br>3. Reduce surface speed<br>4. Increase filament diam | 1. Increase trim length and decrease fill density<br>2. Devise hand held or mechanical fixture or machine which will avoid irregular off-hand manipulation |

*For very ductile metals see Adjustments Column 3

The Iron Age

# SALUTES

## *Bernard F. Coggan*

**This young production specialist makes friends as fast as he unsnarls planemaking difficulties.**

IF you want production in a hurry, Sandy Coggan's your man. Early last year he walked into a production snarl at Consolidated Vultee's San Diego Div., had the assembly line humming in just 6 months.

Convair was behind schedule on assembly of the new 2-engine 340 commercial transport and T-29 Air Force navigation trainer. Output of the B-36 was also lagging. Sandy, only 34 years old, combined his own Detroit production knowledge (13 years with GM) with California's aircraft experience and boosted 340 output from five to eight per month.

He also raised the supervisory ratio from 11 to 1 to 14 to 1, released 2000 workers for other tasks, completed B-36 modification 30 days early—and lowered costs all around. Convair gave him a 5-year contract as San Diego Div. manager.

And he made friends fast. Workers were let in on company problems and goals. Convair executives and supervisors alike aired their gripes and asked questions at dinner meetings.

A native of Gary, Sandy took an E.E. degree at Michigan State in 1939. He started repairing welding equipment at Fisher Body for 50¢ per hr, in 2 years was a general supervisor at GM's Grand Rapids Stamping Div.

In 1941 he joined GM Aircraft Div. at Memphis, Tenn., later worked for GM with Boeing at Seattle on the B-29. Another stint with Fisher Body and in auto assembly plant coordination preceded his shift to Convair.

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The Iron Age

# INTRODUCES

**John F. Ducey, Jr.,** named vice-president, AMERICAN BRAKE SHOE CO., New York, **George E. Anne,** becomes assistant vice-president; and **Daniel J. Wagner,** named district sales manager, Sales Dept., Brake Shoe & Castings Div.

**A. P. Speckin,** becomes president, U. S. DRILL HEAD CO., Cincinnati; **J. R. Bashor,** named vice-president; and **W. K. Francis** named secretary and treasurer.

**John D. Hantz,** named executive vice-president, CONTINENTAL EQUIPMENT CO.; and **Glenn G. Buzza** and **Charles A. Dally,** named vice-presidents.

**A. J. Cayia,** made vice-president and general manager, Caland Ore Co., Ltd., Canadian subsidiary of INLAND STEEL CO., Chicago.

**Leroy A. Hughes,** made a vice-president, Utilex Co., subsidiary of UNIVERSAL DIE CASTING & MFG. CORP., Saline, Mich.

**Werner I. Senger,** elected vice-president in charge of balancing, GISHOLT MACHINE CO., Madison, Wis.

**A. A. Probeck,** elected vice-president, SNAP-TITE, INC., Union City, Pa.

**H. P. Rees,** promoted to assistant vice-president, SHARON STEEL CORP.; **W. J. McGaffney,** appointed general works manager, Lowellville Works; and **Henry Evans** becomes general works manager, Roemer Works.

**R. L. Hanes,** appointed assistant to the vice-president in charge of sales, THE COLORADO FUEL & IRON CORP.

**Karl S. Howard,** appointed assistant vice-president, Foundry Div., CANADIAN CAR & FOUNDRY CO., LTD., Montreal.

**Bert O. Brand,** elected a director of VANADIUM CORP. OF AMERICA.

**C. C. Hurlburt,** becomes director of engineering, KLINCHER LOCKNUT CORP., Indianapolis.

**William F. Langefeld,** appointed director of purchases, THE MAYTAG CO., Newton, Iowa.

**Robert H. Allgood,** appointed director of public relations, DETREX CORP. of Detroit.

**Roy O. Johnson,** appointed metallurgist, THE HYDRAULIC PRESS MFG. CO., Mount Gilead, Ohio, and **Charles W. Eastman,** named industrial engineer.

**William C. Davidson,** appointed abrasive engineer, West Virginia territory, NORTON CO., Worcester.

**A. F. Wiest,** placed in charge of all manufacturing operations, Alloy Tube Div., Union, N. J. for CARPENTER STEEL CO.

**Lou R. Gallas,** appointed sales engineer for electropolishing processes and installations, ELECTRO-GLO CO., Chicago.

**Frank R. Romeo,** appointed superintendent, Roll Hardening Dept., THE MIDVALE CO., Nicetown, Pa.

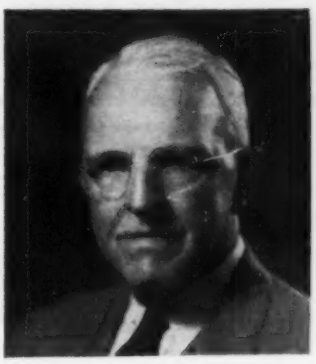
**Walter J. Kallmyer,** appointed chief engineer, STANDARD STEEL CORP., Los Angeles.

**L. G. Bygrave,** appointed manager of sales, Craine-Schrage Steel Div., DETROIT STEEL CORP., Detroit.

**J. P. Coughlin,** appointed manager, Arc Welding Dept., WESTINGHOUSE ELECTRIC CORP., Pittsburgh.

**David A. Kuniholm,** appointed manager, Special Products Div., in addition to his duties as manager of the Industrial Roll Div., RODNEY HUNT MACHINE CO., Orange, Mass.

BYRON L. FOSTER, elected president, L. B. Foster Co., Pittsburgh.



JOHN R. FREEMAN, JR., appointed vice-president of metallurgy and research, The American Brass Co., Waterbury, Conn.

E. W. RISTAU, appointed vice-president in charge of sales, Power Tool Div., Rockwell Mfg. Co., Pittsburgh.

## Personnel

*Continued*

**Fred B. Shew,** named sales manager, Bucket Dept., THE WELLMAN ENGINEERING CO., Cleveland.

**Russel L. Gergen,** appointed sales manager, The Gage Div., THE PIPE MACHINERY CO., Cleveland.

**William C. Ridge,** appointed works manager in charge of manufacturing operations of the Trenton and Roebling, N. J. plants, JOHN A. ROEBLING'S SONS CORP.

**E. W. Hoster, Jr.,** named district sales manager in Columbus; JONES & LAUGHLIN STEEL CORP.; and **F. A. Haynes,** named district sales manager, Louisville.

**Duanne R. Lamiman,** named district sales manager, New York office, U. S. Gauge, Div. of AMERICAN MACHINE & METALS, INC., Sellersville, Pa.

**Raymond C. Gintert,** returns as district manager, Warren, Ohio, REPUBLIC STEEL CORP.

**Harold F. Fulton,** joins New York State staff, WYANDOTTE CHEMICALS CORP. in Buffalo.

**A. B. Fisher, Jr.,** named assistant general manager, Engineering and Construction Div., KOPPERS CO., INC., Pittsburgh; and **G. P. Wilson, Jr.,** will becom manager of control, same division.

**Wyman K. Ender,** joins products engineering department, THE TRANE CO., La Crosse, Wis.

**Elliot Schiek,** joins engineering staff of EBERT ELECTRONICS CO., Hollis, N. Y.

**John P. Sweeney,** appointed district manager, FIRTH STERLING INC.; and **Munro J. Mann,** becomes assistant district manager, Detroit branch.

**John D. MacNamara,** named field sales manager, BECKMAN INSTRUMENTS INC., South Pasadena, Calif.

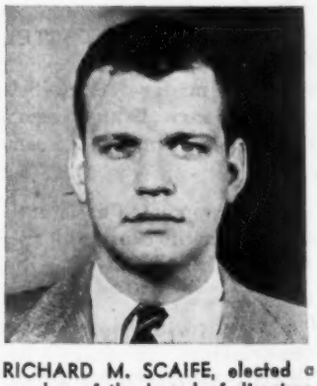
**Edward N. Ryan,** appointed assistant manager, New York branch sales office, CRUCIBLE STEEL CO. OF AMERICA, Pittsburgh.

**Hal Ernst,** appointed sales manager, Hydraulic Control Div., BLACKHAWK MFG. CO., Milwaukee.

R. LESLIE MULLEN, made assistant to the president, Lehigh Structural Steel Co., Allentown, Pa.

WILLIAM R. LOCKRIDGE, named director of market development, The New York Air Brake Co., New York.

JOHN S. GATES, elected treasurer, Foote Mineral Co., Philadelphia.



RICHARD M. SCAIFE, elected a member of the board of directors, Scaife Co., Pittsburgh.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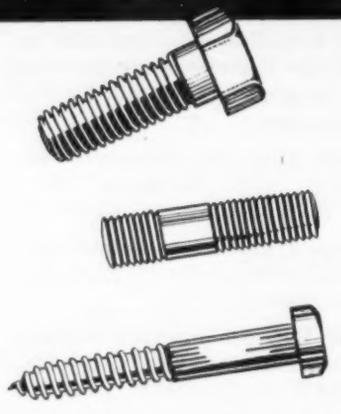

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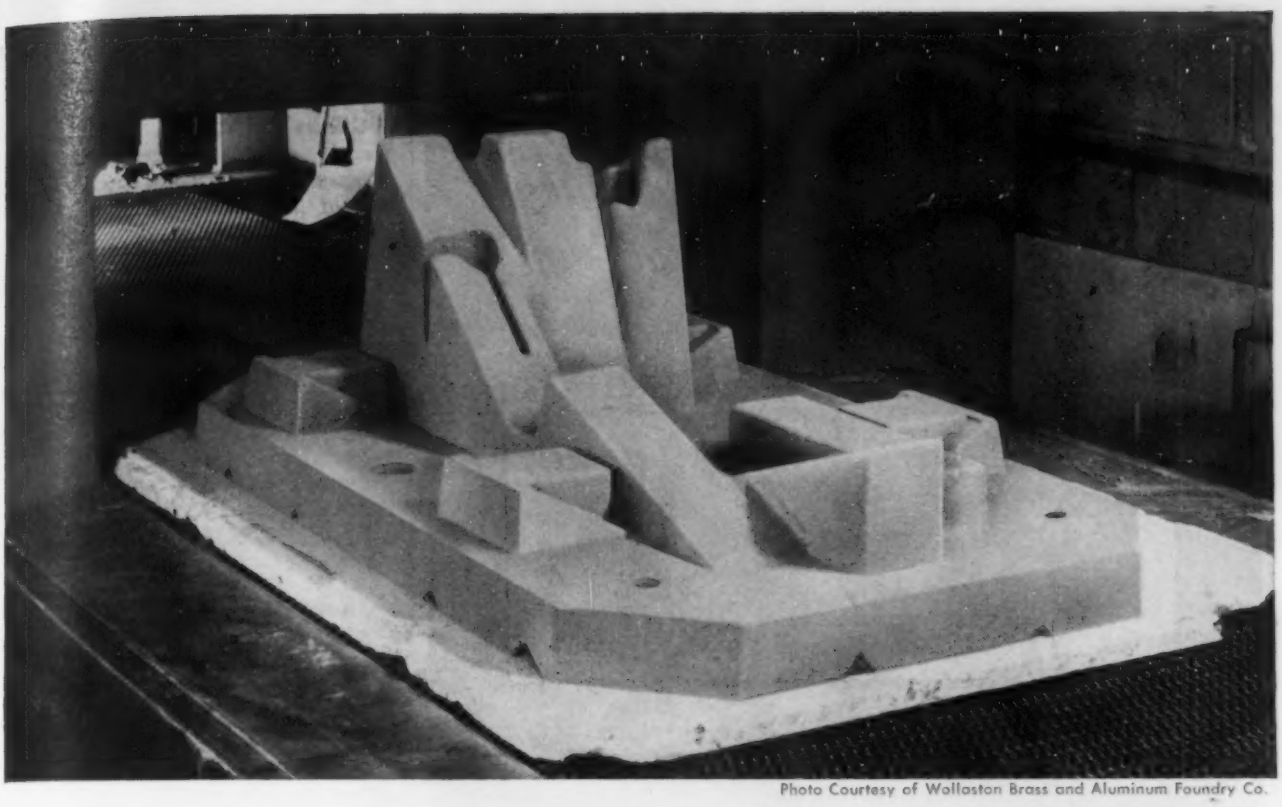

Photo Courtesy of Wollaston Brass and Aluminum Foundry Co.

# New odor-free urea core binding resin

## Monsanto's Resimene 970 cuts baking time up to 40 percent, compared to oil-bonded cores...

To its long list of research-built resins serving the foundry industry, Monsanto now adds Resimene 970—a new urea formaldehyde core binder that eliminates odor at the muller and core making station, and produces better baked cores in 40 percent less time.

Resimene 970 produces unusually accurate cores with sharp edges and no loose sand grains to rub off. Cores have greater over-all strength to withstand rough handling; reduce core scrap.

More than this, Resimene 970 eliminates shakeout problems and fissures . . . means less gas, greatly improved water resistance, less oven maintenance, and fewer scrap castings. Also, with Resimene 970 an underbaked core is a rarity.

If your problem is to eliminate unpleasant odors at the muller or core making station – or a production bottleneck – Resimene 970 can solve it. Why not send for full information today? The coupon is for your convenience.

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**Core Binding** . . . Foundrymen find Monsanto a ready source of a full line of phenolic and urea core binding resins. Call on Monsanto for the job-fitted resin that best meets your individual needs.

**Shell Molding** . . . Monsanto produces a full line of resins specifically for the new shell molding process. You—like hundreds of other foundrymen—can look *first* to Monsanto for the latest developments, information and know-how on shell molding.

**Lytron 886 Sand Conditioner** . . . Another Monsanto development for the foundry. In sand casting, Lytron 886 sand conditioner produces units with superior finish, requiring less clean-up. Lytron 886 reduces rejects, simplifies sand moisture control.

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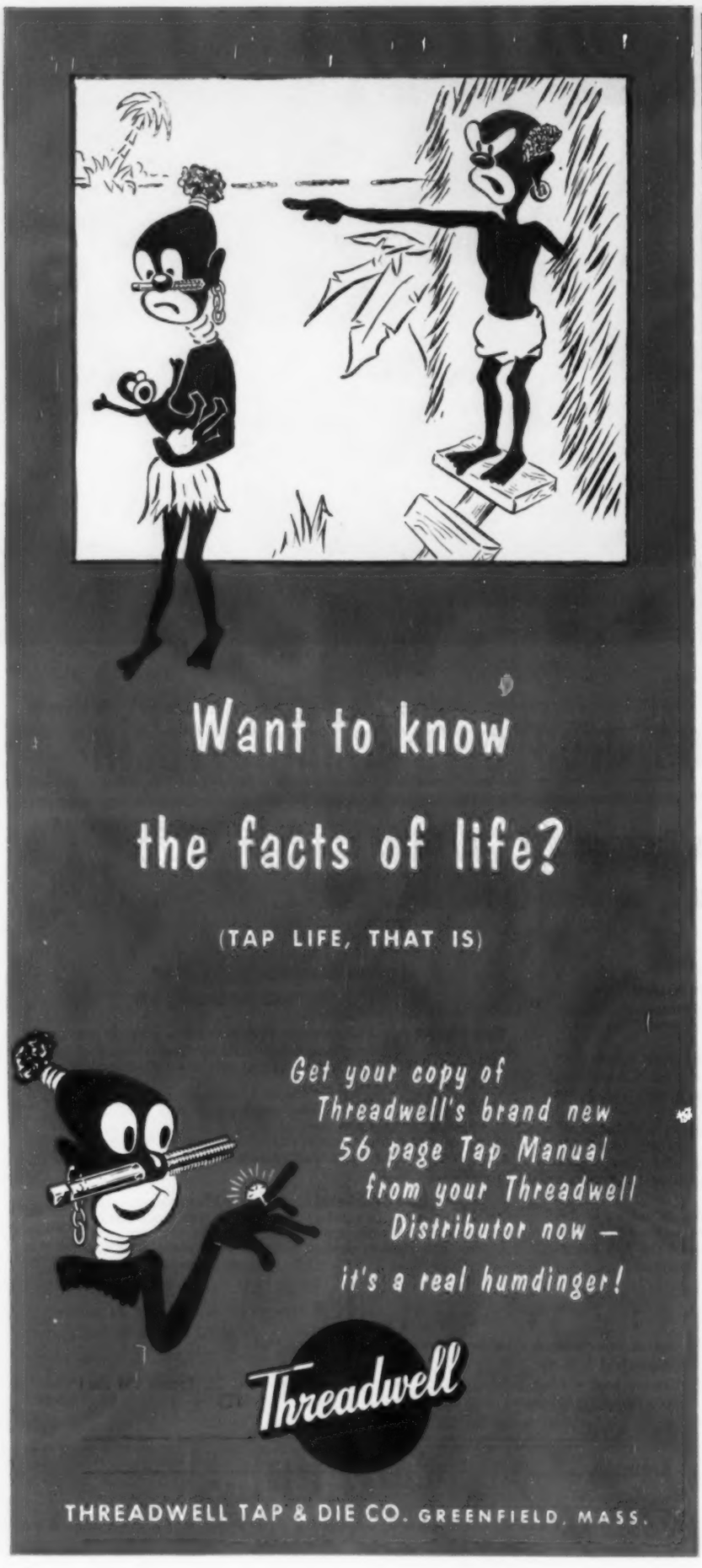



## Personnel

*Continued*

**Gilbert J. Schuelke,** appointed assistant sales manager, Chain & Transmission Div., CHAIN BELT CO. of Milwaukee.

**Bryan Rudder,** appointed a direct salesman for the Philadelphia office, A. P. GREEN FIRE BRICK CO., Mexico, Mo.

**F. F. House,** appointed sales manager, Philadelphia territory, MUELLER BRASS CO., Port Huron, Mich.

**Donald A. Hanan,** appointed sales representative, PETERSON STEELS, INC., Union, N. J.

**A. F. Petan,** promoted to sales representative, PORCELAIN METAL PRODUCTS CO., Carnegie, Pa.

**Price Davis,** appointed manufacturers' representative in Wisconsin, HORTON CHUCK, division of The E. Horton & Son Co., Windsor Locks, Conn.

**Jim P. Kay,** appointed central western representative, H. H. BUGGIE & CO., Toledo.

**Gifford Kittredge,** appointed New York Regional manager, LAMSON CORP., Syracuse.

**R. J. Sprott,** named assistant production manager, Engineering & Construction Div., KOPPERS CO., INC., Pittsburgh; **C. S. Carden,** named chief engineer; **A. D. L. Orefice,** named assistant chief engineer; and **C. G. Barnett,** becomes manager, By-product section, Engineering & Construction Div.'s, Engineering Dept.

**Gilbert B. Valentine,** appointed sales manager, Technical Processes for Promat Div., POOR & CO., Waukegan, Ill.

**Raymond P. Logan,** elected to membership in the CONTROLLERS INSTITUTE, New York.

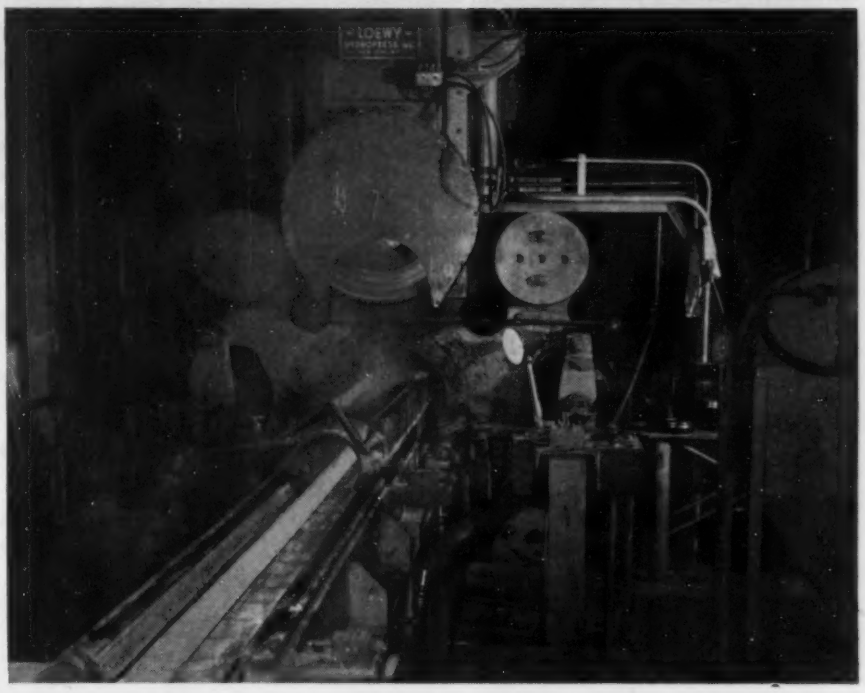
**Frank Komerska,** appointed Detroit plant manager, AINSWORTH MFG., CORP.

### OBITUARIES

**A. N. Goddard,** 80, founder and chairman of the board of Goddard & Goddard Co., Detroit, recently in Key West, Fla.

**Lewis E. Spear,** 86, president of Pacific Wire Rope Co., Los Angeles, recently at his home in Santa Barbara, Calif.

*Glass handled with care—*



# How National Tube HOT EXTRUDES Stainless Steel Tubing

By D. I. Brown
Technical Editor

- Seamless stainless steel tubes 1½ to 3½ in. in diam and 20 to 40 ft long are being hot extruded at the Gary Works of National Tube . . . Ugine-Sejournet process is used . . . Several grades of stainless are extruded.
- Materials handling in the new installation has been carefully planned . . . Monorail conveyer and other handling mechanisms move billets through furnaces to the extrusion press.
- Major equipment includes extrusion press, heating furnace and salt bath furnaces . . . Billets are cold sawed from hot-rolled and turned bars . . . Depending on size, billets are lathe drilled or pierced on the extrusion press.

◆ HOT EXTRUSION of stainless tubes has been underway since last September in the Gary Works of the National Tube Div., United States Steel Corp. Seamless tubes 1½ to 3½ in. in diam and 20 to 40 ft in length have been produced in various grades of stainless steel, table p. 132, using the Ugine-Sejournet process. Present plans call for future use of the equipment to produce both regular and irregular shapes.

So far production rates are as high as 40 extrusions per hour. Officials expect even higher production as more experience is gained with the process and equipment. Tube tolerances, wall thickness, eccentricity, outside diameter and run-out are held to regular seamless tube standards.

First step in making the extruded product is preparation of the billets. Billet stock is cold sawed from hot-rolled and turned bars. Billets

***Most of the tubes have been made from drilled billets. Tubes over 3½ in. OD can be pierced and extruded from solid billets.***

can vary from 5¾ to 8 in. in diam and from 9 to 28 in. in length. Bars 7 in. in diam have been used in greatest tonnage to date. National Tube has four container sizes for its press: 6 in., 6⅝ in., 7¼ in. and 8⅜ in. For the 7¼ in. container, the 7 in. diam round turned to a tolerance of plus zero, minus 0.040 in. is used.

Front outside edge of the billet is chamfered on a lathe. The chamfer prevents undesirable corner cooling. The back edge is not chamfered. The billet is then taken to the drilling machine. Holes smaller than 2 in. in diam are drilled through the length of the billet. Larger holes can be pierced on the press. In the drilling operation the drill remains stationary and the billet turns.

After the center hole is drilled, the billets move to the arcwelding machine shown in Fig. 1. Here a flux-filled stud is welded to one end of the billet. This stud permits the billet to be hung on a special type monorail conveyer system which takes the billet through the heating furnace and salt baths to the feeding table of the Loewy Hydropress extrusion press.

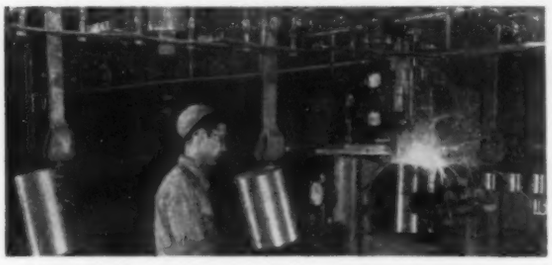


FIG. 1—Carbon steel studs are electric arcwelded to the drilled billet. Semiautomatic Nelson studwelding equipment and the flux-filled studs, which Nelson Stud Welding Div., Morton Industries Inc. developed, eliminated the need for costly carriers.

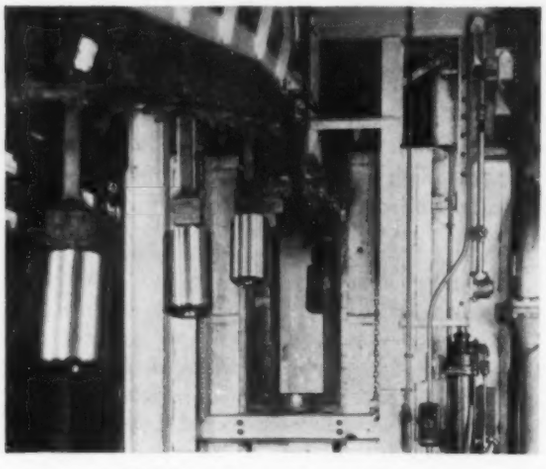


FIG. 2—Cold billets enter Selas vertical furnace which is fired with coke-oven gas.

The entire conveyer line indexes one station forward each time a billet moves out of the furnace. The cold billets enter the three-zone, 55-ft long Selas Furnace, Fig. 2. A top shoe on each conveyer arm rides on a water-cooled pipe on top of the furnace. Thus only the billet and suspended hook bar, made of 25-12 stainless, are exposed to heat as the shoe riding on the water-cooled pipe track effects a furnace seal, Fig. 3.

The special vertical furnace, Fig. 2, is fired by coke-oven gas. The first heating zone is kept at 2300°F, the second at 2250°F and the last zone is heated to 2200°F. Fully automatic control of heat input and temperature measurement is built into this unit.

### Gas and salt heating used

Ordinarily it takes the billets less than 1 hr to travel through this heating furnace. The billets come out of the heating furnace and are immediately charged into one of the two salt-bath furnaces. An ingenious mechanism lowers the billets into these furnaces which are set at 2300°F. Here, final heat is imparted to the billets which can be held in these furnaces for about 30 min. A longer holding time in the molten barium chloride salt bath is restricted by the strength of the stud. Each furnace holds 8000 lb of salt.

The billets are moved through these furnaces

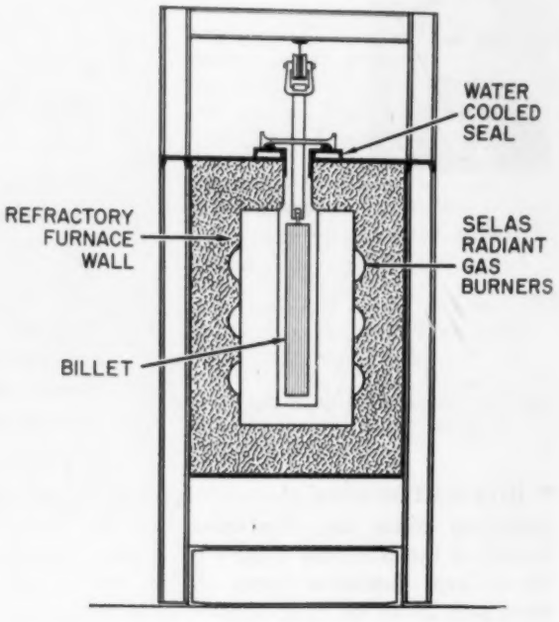
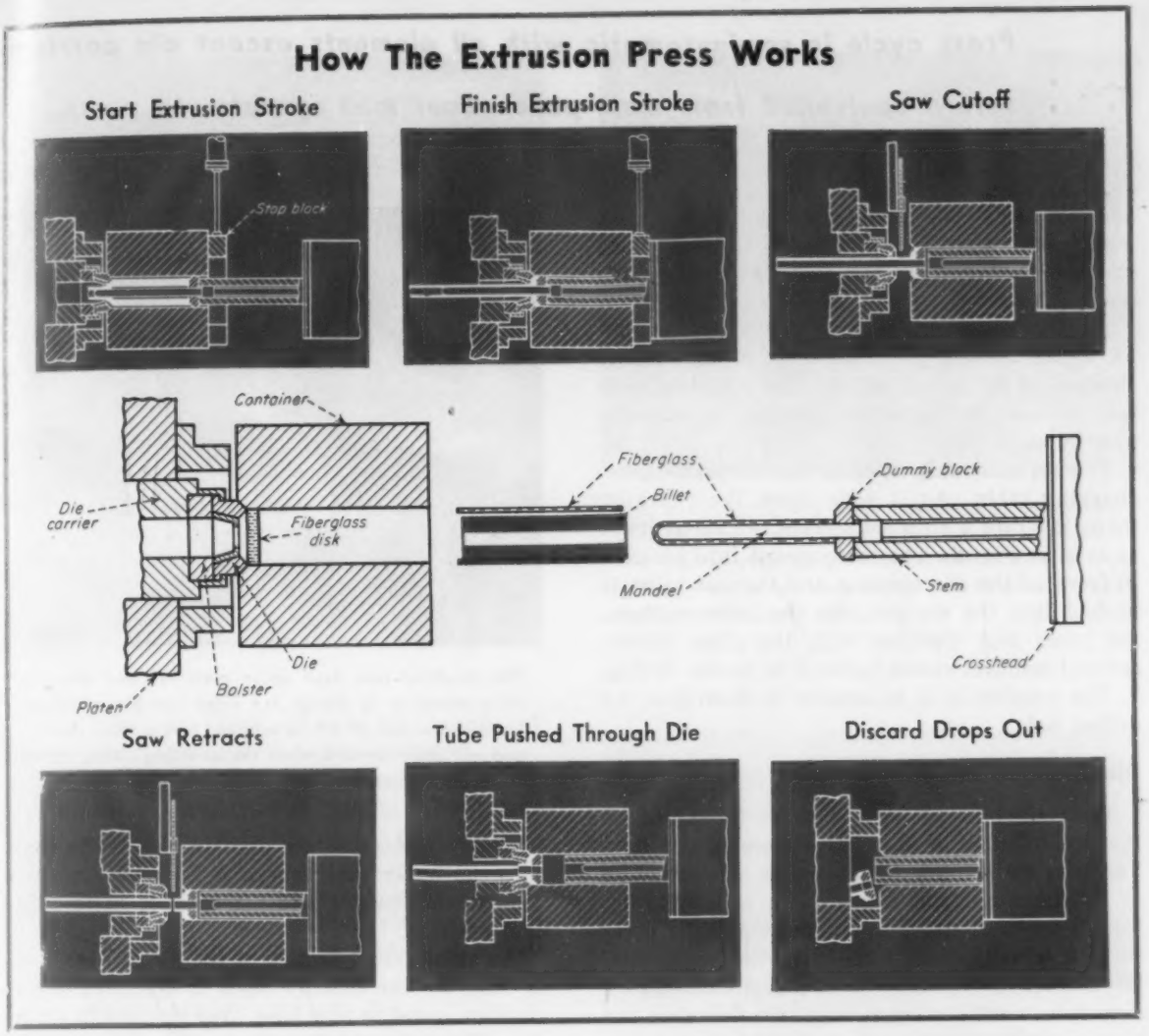



FIG. 3—Schematic cross-section of the top of the Selas heating furnace. Steel shoe rides against water-cooled plate track mounted on top of the furnace to effect a seal. Hook bar is made of stainless steel.



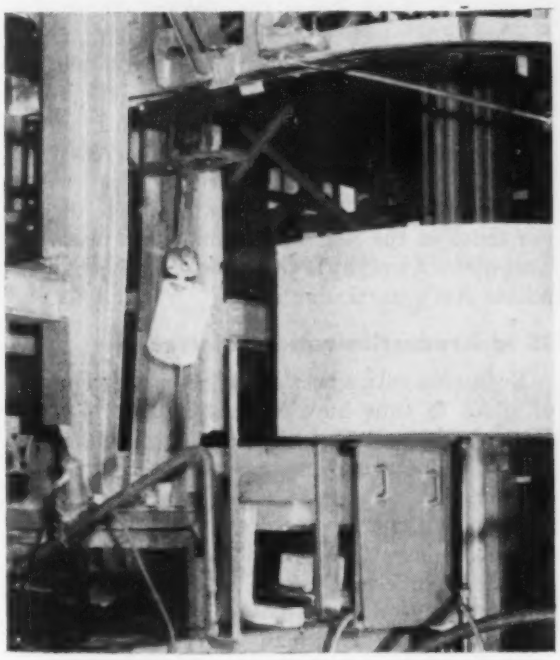



FIG. 4—Heated billet is lifted out of a Holden salt bath furnace. Overhead conveyer delivers this billet to the discharge chute. Salt layer on billet prevents scaling. Next stop is the receiving station, Fig. 5.

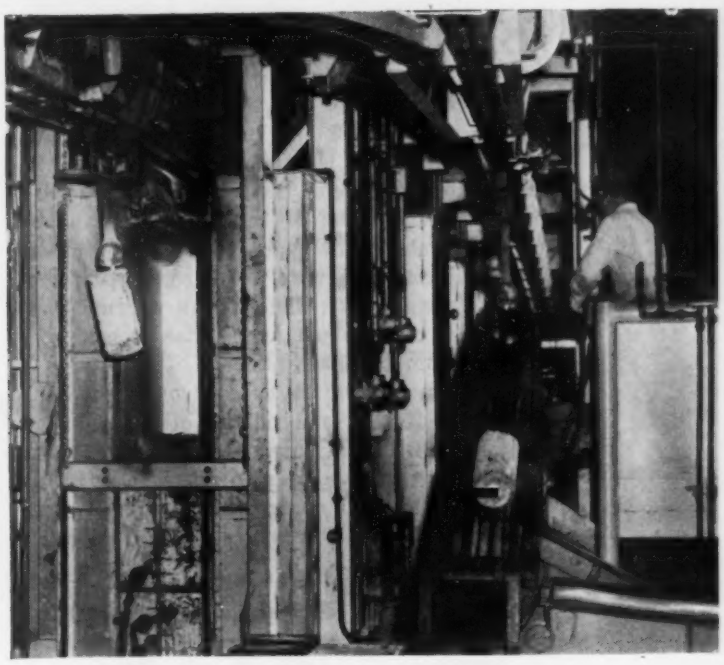


FIG. 5—Operator cuts off stud and billet slides down chute. Glass veil can be seen on charging table, lower right. At left, a billet leaves gas furnace on way to a salt bath furnace.

***Press cycle is semiautomatic with all elements except die carriage return controlled from main panel. Four men operate the press.***

and elevated to the conveyer as shown in Fig. 4. Some salt dragout is experienced. The salt which clings to the billet prevents further oxidation and scaling however.

As the conveyer delivers the scale-free billet to the receiving station, Fig. 5, the stud is sheared off by an air chisel. The stainless hook then returns to the welding station to receive a new billet.

The hot billet falls down to the extrusion press-charging table. As it rolls down the charging table, it wraps a thin spun-glass veil about itself as seen in Fig. 6. The table moves into position in front of the die opening and the hot billet is pushed into the die pot. As the table retracts, the press ram together with the glass fabric-covered mandrel moves forward as shown in Fig. 7. The mandrel is ¼ in. smaller in diam than the drilled hole.

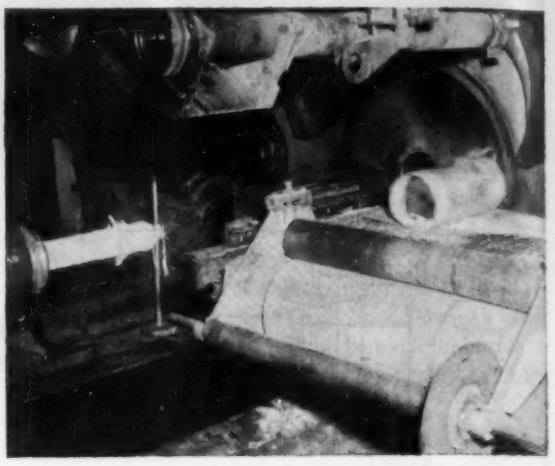


FIG. 6—Billet rolls itself up in glass veil and charging table moves in to charge hot billet into die container. The mandrel bar, at left, is wrapped with a glass stocking and will start forward when the charging table returns to its original position.

### Die changed for each tube

The main ram carries a 2000-ton force against the hot billet at a speed maximum of 30 ipm. The tube exits from the other side at a speed 25 to 50 times the ram speed. The mandrel ram, backed by 500 tons of additional hydraulic pressure, is usually used along with the main ram. When making a tube with an inside diameter of over 2 in. a solid billet is used. In this case the piercer cylinder acts independently during the piercing operation and additively to the main ram while making the extrusion.

At the end of the extrusion stroke the container retracts enough for the hot saw to come down between the die and the front end of the container and cut off the tube. The ram then advances and pushes the tube free of the die. A delivery table then takes the tube down the mills.

Between pushes the die is changed, mandrel is cooled as shown in Fig. 8 and the container cavity is cleaned by a wire brush rotating at the end of a long shaft. The brush carrier and dummy block mechanisms are semiautomatic and controlled from the main panel.

As the ram pushes the tube through the die, the butt or discard end of the billet, and the dummy block which fits over the end of the ram, fall to a conveyer which returns them to floor level close to the main control panel. The discard is squeezed off the dummy block in a special hydraulic press and the dummy block rolls down into the water tank where it is picked up by a mechanical elevator and placed back in its original position.

An etched cross-section of the discard is shown in Fig. 9. The dummy block is designed to encourage metal to flow back over its outside diameter. Note the flash at bottom of Fig. 9. This metal flow is aided by channels cut in the dummy block. The flash keeps the discard fastened to the dummy block and allows the container to pull back and provides clearance for the hot saw during the cut off.

Circular spacer rings which can be seen in Fig. 8 are used between the container and the main ram. These permit control over how much butt or discard is left in the press. Average discard per billet on the 7-in. diam rounds has been 7 lb. This discard weight is the same for all lengths of billets for a particular size.

### 35 to 1 reduction ratio preferred

Reduction ratios between the cross-section area of billet to tube have run as high as 50 to 1. However, ratios of about 35 to 1 are preferred as higher ratios mean greater wear on the mandrel and die, etc.

Four men operate the press; one at the charging table, one at the control panel, one to handle the die change and one to separate the discard butt from the dummy block and handle lubrication materials. The man at the control panel operates all the equipment except the die carriage which is on the delivery side of the press. After leaving the press the tube is conveyed on a roller-table past the hot saw, and from there

**TYPES OF STEEL HOT EXTRUDED**

| Austenitic | | Ferritic | Miscl. |
|---|---|---|---|
| 303 | 321 | 410 | 1½ Cr-½ Mo |
| 304 | 347 | 416 | |
| 310 | | | |

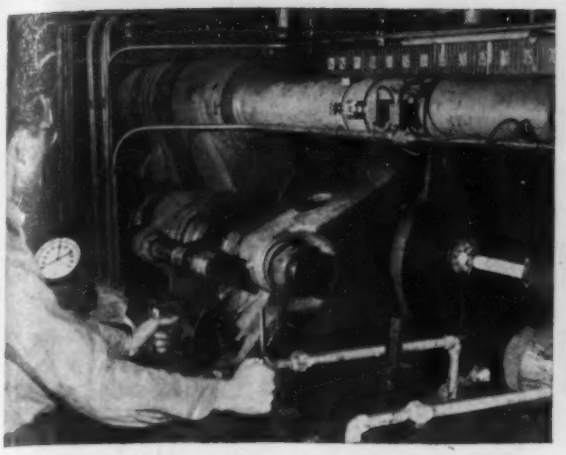


FIG. 7—Press operator positions glass stocking-covered mandrel so that it will enter hole in billet resting in container. At this stage, spacer rings are in position in front of container to halt forward motion of the ram. Rings are power operated.

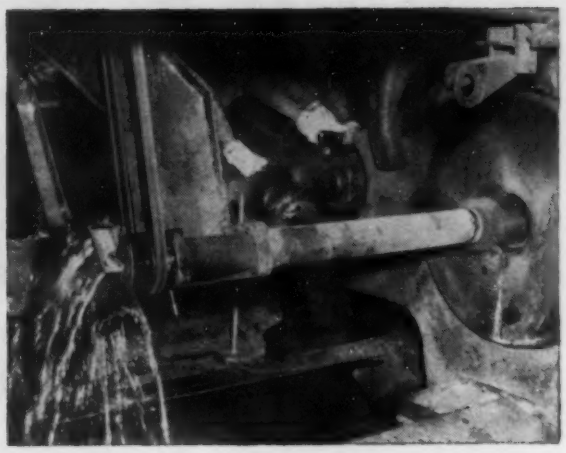


FIG. 8—Revolving wire brush moves out of cavity after cleaning liner walls. The mandrel bar is pulled back and given a water bath inside the mandrel ram to cool it. Ram travel spacer rings can be seen in raised (open) position at the upper right.

into a quenching tank. Austenitic grades of stainless are immediately water quenched.

So far National Tube has been concentrating production on medium-size tubing. The sizes made range from 1½ to 3½ in. OD in wall thicknesses of 0.134 in., 0.165 in. and some 5/16-in. wall tubes. Although the press is capable of extruding 80-ft lengths, billet size has been restricted so that most lengths made to date run between 20 and 40 ft.

Die wear is not the problem that breakage is because worn dies can be redressed and used for other tube sizes.

Buildup on the die is usually an indication of proper lubrication and die setup. This buildup is composed of salt scale and glass and is chipped off the die face quite easily.

The same type of surface layer exists on the outside and inside surface of the extruded tube. This coating is thin and tenacious. A fluoride-type pickle bath has been used with good results to clean the tubes before they are sent to the tube reducers or draw benches for final cold reduction.

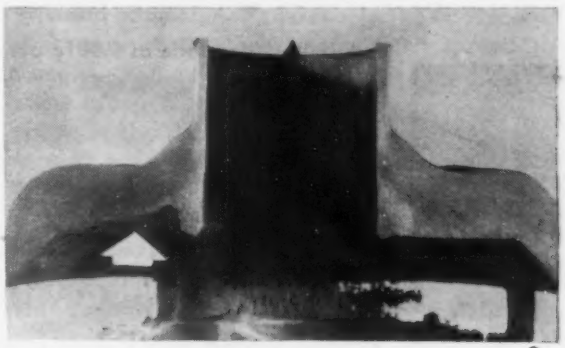


FIG. 9—Etched cross-section of discard shows flash at bottom. Arrow points to the carbon steel stud tip which does not end up in tube but in discard part of billet. Flash holds dummy block to discard.

As the process is developed further and the most suitable die steel and glass lubrication is determined, plans call for extrusion of smaller and thinner wall tubes along with intricate steel shapes.

## BACKGROUND

Although research on the hot extrusion of ferrous metals has been going on for over 30 years it was not until 1940 that real progress started. In that year a French company, Comptoir Industriel d'Etirage et Profilage de Metaux, Paris, organized a research project that culminated in a steel extrusion process that proved commercial. This plant was built at Persan, France, and started operations in Jan. 1949.

The biggest single hurdle to successful steel extrusion had been the lack of a satisfactory lubricant. The French overcame this problem by the use of glass. Since that time a number of American companies have been licensed to use the process. These licensees include: Allegheny Ludlum Steel Co., Babcock & Wilcox Co., Tubular Products Div.; International Nickel Co.; Jones & Laughlin Steel Corp.; National Tube and others. The French are concentrating on shapes while we are working mostly on tubing.

# BRUSHES:
# Production Tools for GOOD SURFACE FINISHES

- Brushing can remove burrs, slivers and other surface imperfections without appreciably changing the shape or dimensions of a part . . . Brush flexibility permits controlled blending of surface irregularities.
- Surfaces having an original finish of 24 to 35 microinches can be brushed to a finish of 4 to 7 microinches . . . Finish may appear duller than a buffed or polished surface . . . It does not hide defects.
- Automatic brushing can finish 1000 to 2000 parts per hr . . . Materials cost is as little as 0.001¢ per processed part.

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Technical Dept.
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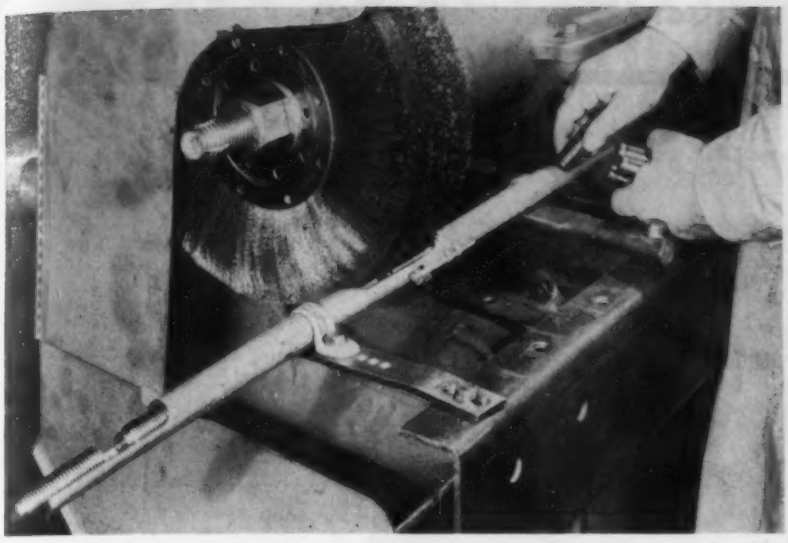
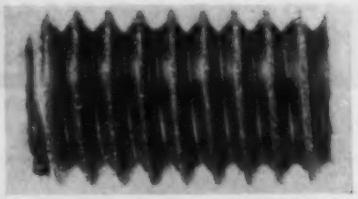
◆ BRUSHES ARE TOOLS for many jobs, including conditioning of surfaces to specific characteristics. They can remove burrs, slivers and lightly attached particles, finish edges by blending the junctures into smooth curves, remove surface films and encrustations, impart major characteristics to surfaces or move materials from or along the surface. They are not intended to remove appreciable quantities of a surface to achieve dimensional size. A major advantage of brushing is the extremely wide range of mechanization possible.

Metal surfaces requiring finishes less than 30 microinches rms usually require the use of one group of brushes. Another group is used when finishes are to exceed 30 microinches. Further selection of the correct brush involves three major brush characteristics: (1) flexibility, (2) finishing ability and (3) brushing action strength.

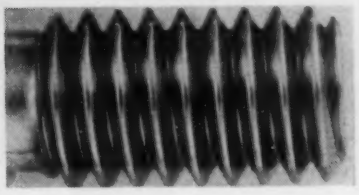
Use of the chart on the third page of this article will help to select a brush of high or low flexibility, and to determine for fast or slow brushing action. The first brush selected may not be the most efficient for a particular job. Six categories of adjustments listed at

COMPARISON OF GEARS before (below) and after (above) brushing. Burrs and sharp edges are removed in 18 sec, including handling time. No secondary burrs or sharp edges are created by brushing.





POWER BRUSH removes sharp edges and improves surface finish of threads without changing their shape. Brushing is done by stove-pipe method.



the bottom of the chart suggest means to overcome difficulties.

Brush construction is an important factor in its selection. Three general types of construction are used for industrial brushes: (1) helical, (2) strip, and (3) sectional. Helical construction is suited for brushes requiring wide faces such as those used for finishing or scrubbing strip steel. Brushes of strip construction also have wide faces but are characterized by low fill density. These brushes are used for cleaning conveyer belts and mechanical floor sweeping. The main feature of sectional brushes is that the face width of a brush can be built up to various increments.

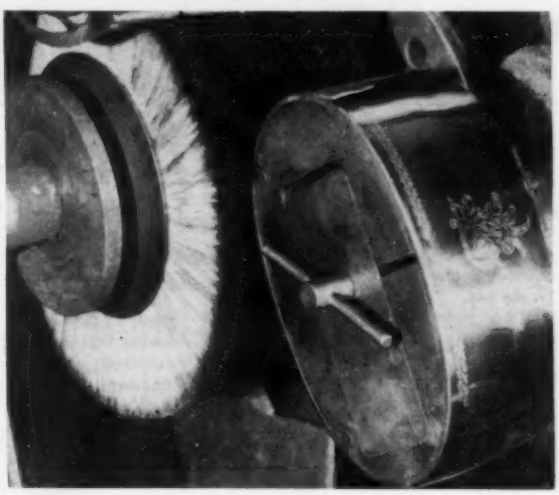
Ability of a brush to withstand working stresses depends on such parts as the retaining member. Loss of brush material due to slippage or pulling out is encountered only in a poorly made brush. The back or hub of a well made brush is accurately formed to permit the use of sections side by side. Sections should readily fit a standard arbor, although adaptors or flanges are sometimes used for the purpose.

Cooling by ventilation is often a requirement for nonmetallic brushes. This is particularly so when the brush face is 3 in. or more and the work cycle is continuous. Air vents in the hubs facilitate air flow and reduce or eliminate scorching and burning. Brush material, acting as a fan, throws out air from between the filaments and causes more air to be drawn through the vents. Nonmetallic fill brushes should not exceed a temperature of 130°F, otherwise brush life will be greatly reduced.

Flexibility of a brush enables it to conform to the contour of a workpiece. By comparison, abrasive belts and wheels tend to work on the high spots. For this reason, a brush blends the edges of surface irregularities into smooth curve junctures. It also disperses stresses which concentrate at sharp edges. Power-driven brushes have helped to solve many problems of stress distribution by avoiding local stress concentration and progressive fracture.

Bolts and studs often rupture after being subjected to repetition of a tensile load. Failures starting at the root of the thread or at a scratch produced by a burr spread inwardly. Removal of sharp edges and improvement of surface finish, without changing the shape of the threads or removing a measurable amount of metal, spreads the stresses and aids in overcoming a major thread finishing problem. Removal of burrs also helps to equalize load distribution.

Another example of effective power brushing is the removal of excess rubber from a pin used for tank tracks treads. Special cutters can be used economically, but by brushing the pins, surfaces resist the formation and spreading of microscopic cracks which cause rupture through fatigue. Cutting tools, regardless of speeds and feeds used, produce marks and fragment



BRUSHING BLENDS IMPERFECTIONS of a surface so that a good plating job can be done. Flexibility of brush enables curved surfaces to be finished easily. The design on the shell is unblurred by brushing.

## HOW TO SELECT AND USE POWER BRUSHES

| For Jobs Requiring Surface Finish Less Than 30 Microinches rms | | | For Jobs Which Permit or Require Surface Finish Exceeding 30 Microinches rms* | | |
|---|---|---|---|---|---|
| Brush Flexibility: Medium → High | | | Brush Flexibility: Low → High | | |
| Brush Finishing Ability: Very Fine (Low rms) → Medium | | | Brush Finishing Ability: Fine → Coarse | | |
| Brushing Action: Medium → Very Fast | | | Brushing Action: Medium Fast → Medium → Fast | | |
| Cord & Fabric Brushes | Tampico & Treated Tampico Brushes | Fine Wire Sections Used With Burring Compound | Wire Wheels | Wire Sections | Coiled Knot Sections |
| **Major Brush Characteristics** | | | | | |
| Fast cutting medium flexible wheels. Used with cut and color buffing compounds for producing low microinch finishes | Flexible, fast cutting wheels. Used with burring compounds of tacky composition for producing surface finishes of approx. 8 to 10 microinches rms | For efficient use of wire brushes with compound, select brushes having medium or high density and fine wire size (0.008 diam or finer) | Wide face, dense fill. Used where fast cutting and fine finishes are required. Best general purpose wire brush | Narrow face, medium density. Used where medium brush flexibility is essential to follow contoured surfaces | Narrow face, low density. Used where a high degree of brush flexibility is needed and where surface impact action is necessary, especially to remove surface encrustations |
| **Major Applications in Order of General Usage** | | | | | |
| 1. Cut and color buffing<br>2. Surface blending<br>3. Light scale removal<br>4. Producing radii<br>5. Burr removal | 1. Burr (small) removal<br>2. Producing radii<br>3. Light scale removal<br>4. Surface blending<br>5. Cleaning<br>6. Satin finishing | 1. Burr (medium) removal<br>2. Light scale removal<br>3. Satin finishing<br>4. Producing radii | 1. Burr (heavy) removal<br>2. Producing radii<br>3. Rust and oxide removal<br>4. Scale removal<br>5. Cleaning<br>6. Surface blending | 1. Cleaning<br>2. Medium scale removal<br>3. Rust and oxide removal<br>4. Satin finishing<br>5. Surface blending<br>6. Burr removal | 1. Heavy scale removal<br>2. Rust and oxide removal<br>3. Satin finishing<br>4. Producing radii<br>5. Burr removal (on very hard metals) |
| **Adjustments For Desired Results** | | | | | |
| Brush works too slowly | Brush works too fast | Action of brush peens burr to adjacent surface | Finer or smoother finish required | Finish too smooth and lustrous | Brushing action not sufficiently uniform |
| 1. Increase surface speed by increasing OD or rpm<br>2. Decrease trim length and increase fill density<br>3. Increase filament diam | 1. Reduce surface speed by reducing rpm or OD<br>2. Reduce filament diam<br>3. Reduce fill density<br>4. Increase trim length | 1. Decrease trim length and increase fill density<br>2. If wire brush tests indicate metal too ductile (burr is peened rather than removed), change to nonmetallic brush such as a treated Tampico used with burring compound | 1. Decrease trim length and increase fill density<br>2. Decrease wire diam<br>3. Try treated Tampico or cord brushes with suitable compounds at recommended speeds<br>4. Use auxiliary buffing compound with brush | 1. Increase trim length<br>2. Reduce brush fill density<br>3. Reduce surface speed<br>4. Increase filament diam | 1. Increase trim length and decrease fill density<br>2. Devise hand held or mechanical fixture or machine which will avoid irregular off-hand manipulation |

*For very ductile metals see Adjustments Column 3

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ings rest on steps in the insertion pins to assure seating to the proper depth.

The cycle is complete when the press is opened again. As the pins are withdrawn, the bushings remain accurately spaced and sized.

Substantial savings in time and cost result over the previous manual methods.

Two bushings cannot be inserted with this new setup because of their internal locations in the castings. These are inserted manually before the casting is placed in the press.

## MOLDS LAST LONGER:

**Tungsten carbide molds used to make grinding wheels.**

Automaticity, higher speeds, and around-the-clock production runs are putting the pressure on materials. One answer to this problem is the use of wear-resistant materials on vital equipment components to lengthen production runs and overcome expensive down-time.

An unusual example is the use of carbide-equipped molds by Carborundum Co., Niagara Falls, N. Y., to produce silicon carbide and aluminum oxide grinding wheels ⅛ to 4½ in. diam.

Wear-resistant inserts provide average working life about 10 times that of other engineering materials.

One 4-in. mold on an automatic press produced as many as 86,000 pieces and was still in good condition. The mold employed previously lost its efficiency at the end of 2500 pieces.

Cost of the Carboloy tungsten carbide molds averages about three times that of steel. But the cost is more than offset by the wear-resistant qualities of the tungsten carbide metal. The material used in grinding wheels is very abrasive, and the particles act as millions of tiny grinding wheels, grinding away the metal sides of the molds employed to shape them into wheels under pressure.

Rapid wearing of the molds impedes long-run production of uniform size grinding wheels, and makes it necessary to replace the molds frequently to keep the wheel dimensions within specifications.

## END-QUENCH TEST BAR:

**New bar shape simplifies reading of test results.**

A new trapezoidal end-quench test bar, developed to measure the hardenability of carburized steels, is reported to simplify readings of end quench test results.

The bar, developed during a study of "An End Quench Test For Determining The Hardenability of Carburized Steels," was described in a paper by F. X. Kayser, R. F. Thomson and A. L. Bogehold presented at a recent meeting of the SAE Iron and Steel Technical Committee in Detroit.

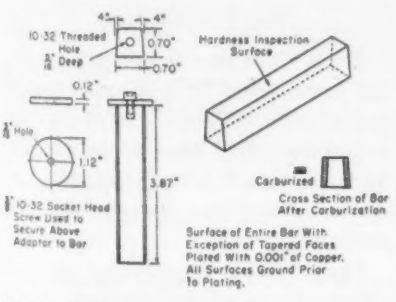
### Replaces Round Bar

Lack of accurate hardenability data for case-carburized steels stems primarily from difficulties in making hardenability measurements. The method commonly used consists of carburizing and end-quenching a round bar, and then grinding to predetermined case depths to determine hardenability at various carbon levels.

### Standard Quench Used

A bar 3⅞ in. long was prepared with a cross-section 0.700 in. on an edge. The bar was completely copper plated. Two 4° faces were ground, removing the copper plate from these sides. Thus only two taper faces were carburized during the carburizing operations. To this cross-section an adapter is fastened to facilitate end-quenching. Overall length from quenched end to shoulder is equivalent to the same length on the standard Jominy bar.

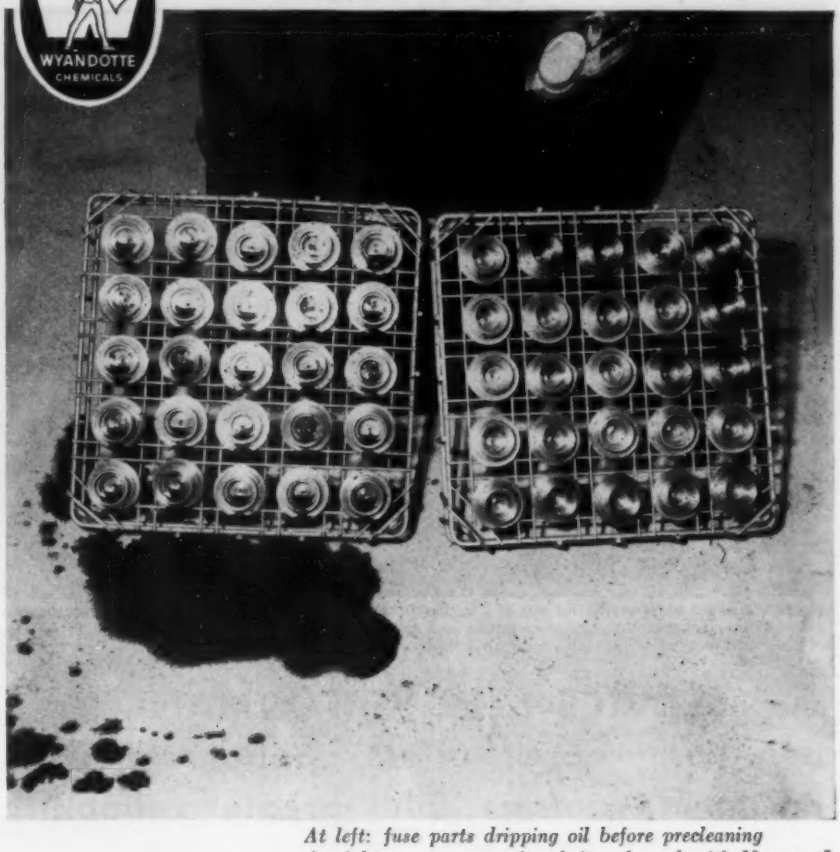
When carburizing was com-


4°
4°
10-32 Threaded Hole ⅜" Deep
0.70"
0.70"
Hardness Inspection Surface
0.12"
¼" Hole
1.12"
3.87"
⅜" 10-32 Socket Head Screw Used to Secure Above Adaptor to Bar
Carburized
Cross Section of Bar After Carburization
Surface of Entire Bar With Exception of Tapered Faces Plated With 0.001" of Copper. All Surfaces Ground Prior to Plating.

TRAPEZOIDAL end-quench test-bar simplified readings by eliminating much grinding.

*Turn Page*


**Specialists in Industrial Cleaning Products**



*At left: fuse parts dripping oil before precleaning*
*At right: same parts after being cleaned with* NORDALL*

# How Wyandotte Nordall solved another tough cleaning problem

***The Problem:***

Steel fuse parts at the Supreme Knitting Machine Co., Inc., of Ozone Park, L.I., New York, weren't getting proper precleaning and rust protection prior to inspection and transfer to a cadmium-plating line. The result — high and costly rejects!

***The Solution:***

At their Wyandotte representative's suggestion, they switched to WYANDOTTE NORDALL . . . a liquid metal cleaner with excellent detergency and rust-inhibiting properties. NORDALL is designed for emulsion pressure spray washing as well as solvent immersion cleaning. There are no "sudden death" problems with NORDALL, for even in spray washers with water at high temperatures evaporation loss is very low. This, of course, means lower consumption and **reduced costs** in addition to dependable performance!

***The Result:***

After being cleaned with NORDALL, these same steel parts were in excellent condition for inspection, and for electrocleaning prior to plating — and they did not rust! Immediately, rejects were cut way down. Supreme told the Wyandotte man, "Don't let us run out of NORDALL!"

NORDALL, or other products in Wyandotte's full line of metal cleaners, may help solve *your* metal-cleaning problems. Ask your Wyandotte representative, or write for free information. *Wyandotte Chemicals Corporation, Wyandotte, Mich.; also Los Angeles 12, California.*

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# SERVICE-FREE PERFORMANCE

## Beryllium copper offers appliance makers design advantages plus greater reliability

For those manufacturers who take advantage of it, beryllium copper reduces failure—increases customer satisfaction. Temperature controls, timers, brush springs and motor overload relays made of Berylco beryllium copper can be depended on to work unerringly—don't require frequent service.

Beryllium moved out of the laboratory into industry when it was discovered that as little as 2 percent added to copper produced an alloy with remarkable properties. No other material meets to the same degree such diverse qualifications as conductivity, mechanical strength, endurance and elasticity. That's why Berylco has successfully solved design problems involving conflicting requirements for practically all industries.

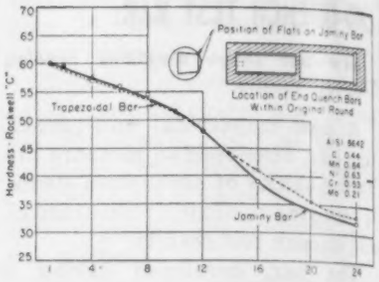
Manufacturers find that these performance advantages can easily be converted into cost-saving ones as well. Where electrical circuits are involved, Berylco's ability to withstand high stresses makes simpler designs possible. Its elastic strength offers space-saving opportunities. Its formability permits easier fabrication.

Once regarded as rare, beryllium copper is now in plentiful supply. Manufacturers interested in using this versatile alloy are welcome to share the facilities and know-how of the world's largest producer. Write THE BERYLLIUM CORPORATION, Dept. 3C, Reading 6, Pa.

*Tomorrow's products are planned today—with Berylco beryllium copper*

BERYLCO PARTS, AND WHERE THEY FUNCTION in the modern kitchen, can be seen by locating the corresponding number in the large photo on this page. The parts shown are: (1) temperature control; (2) oven control; (3) timer part; (4) brush spring; (5) overload relay; (6) toaster spring; (7) contact springs for refrigerators.






COMPARISON of hardenability of AISI 8642, made with Jominy and trapezoidal bars, shows readings on both bars are similar.

pleted, the bar was end-quenched in the standard manner. The hardness impression surface was prepared by removing in the standard manner.

Any point in the case or core, over the entire quenched length of the bar can be examined without repeated grinding operations. Hardness impressions can be made on this surface in a direction essentially perpendicular to the carbon gradient.

### Cooling Is Uniform

Experiments were conducted to determine the uniformity of cooling across the bar at given distances from the quenched end. Bars of 8642 and 80B40 steel were completely copper plated (to prevent surface reactions), austenitized, and end-quenched.

The hardness inspection surface of each bar was polished, and Rockwell C as well as Tukon readings obtained across the bar at a number of "J" distances. These experiments indicated that the cooling rate across the bar at any given distance from the quenched end was sufficiently uniform for test purposes.

### Bar Preparation

Tests were run to compare cooling conditions in the trapezoidal and standard Jominy bars during end-quenching. Bars of each type were prepared from alternate positions along the length of 8642 steel.

These were completely copper plated, austenitized, and end-quenched. Their hardness inspection surfaces and flats were pre-

pared, and Rockwell C readings taken on all bars.

Data indicated that hardenability as measured by either bar is equivalent and, therefore, the cooling conditions induced in each during end-quenching must be the same.

### Here Are Results

Summarizing development work on the trapezoidal bar, it has been shown that:

(1) The bar has a hardness inspection surface providing access to any point in the case, or in the core, over the entire quenched length of the bar without the necessity of repeated grinding operations.

(2) Hardness inspection surface sections the case in such a manner that hardness impressions can be made essentially perpendicular to the concentration gradient.

(3) The bar cools similar to the Jominy bar during end-quenching, and should yield equivalent hardenability measurements.

(4) Each trapezoidal bar is essentially self-checking since two cases are available for inspection.

## MACHINING:

**Shear type trimmer cuts machining time in half.**

Washing machines of the automatic home-laundry type, such as those made by the Whirlpool Corp. of St. Joseph, Mich., use a hollow shaft made from tubing of 1 3/16-in. OD and having a 1/16-in. wall thickness.

Each shaft has a slot cut across one end to fit a driving component. Until recently, slots were cut on a milling machine at the rate of 350 per hr but a faster method was sought.

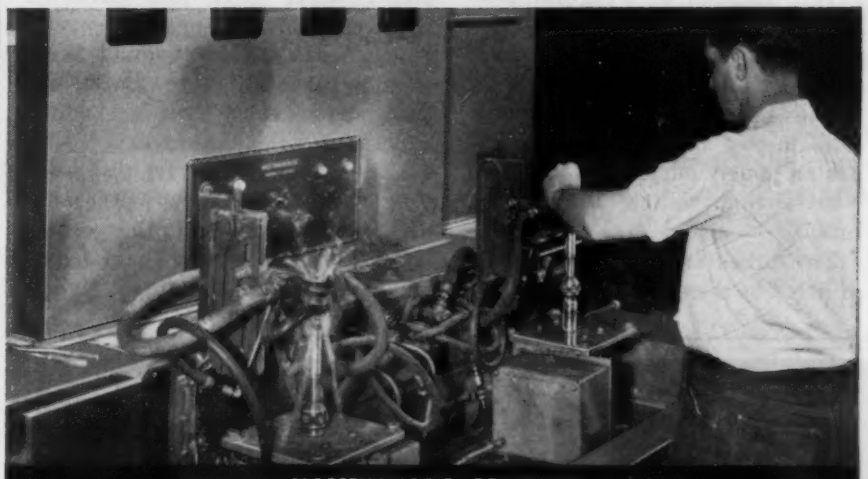
### Why Not Shear It

Because the wall thickness of the tube is only 1/16 in., shearing out the two pieces of metal was suggested as more practical than milling.

The possibility of using a trimmer was considered, especially one

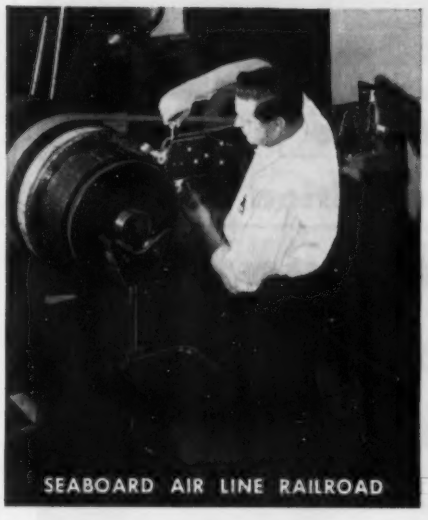
*Turn Page*

# Industries

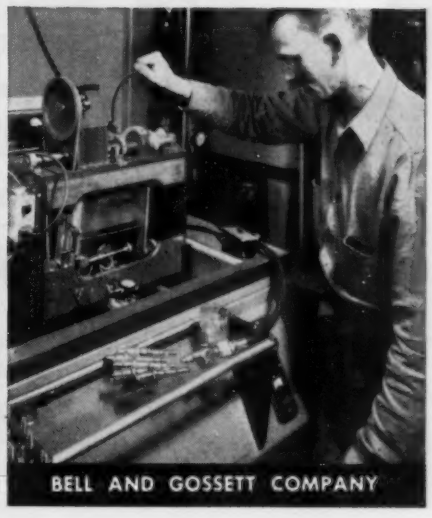


MASSEY-HARRIS COMPANY

# across the nation



SEABOARD AIR LINE RAILROAD



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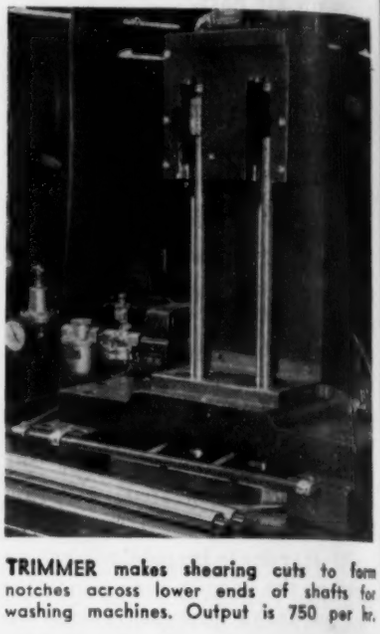
J-02262

having stepped or irregular trim lines. This led to the building of a specially-designed Model trimmer.

The new trimmer shears the slots in two shafts at a time and has an hourly output of 750 shafts —more than double the milling rate.

Two tubes are placed vertically in holes in the upper die, bringing their lower ends into shearing position and the upper ends resting in slots of a clamping head. As the tubes are moved backward, they move limit switches which operate a solenoid valve.

The valve admits air to clamping cylinders equipped with rams. As the rams advance, they center the tubes and press them firmly downward, clamping them tightly against the lower-end faces.



**TRIMMER** makes shearing cuts to form notches across lower ends of shafts for washing machines. Output is 750 per hr.

When the tubes are clamped, the operator presses an air-valve lever which moves the shearing punches radially outward to make the shearing cut. After the cut is made, the punches retract immediately and the top clamps are released. The tubes are then removed by hand, leaving the setup ready for the next cycle.

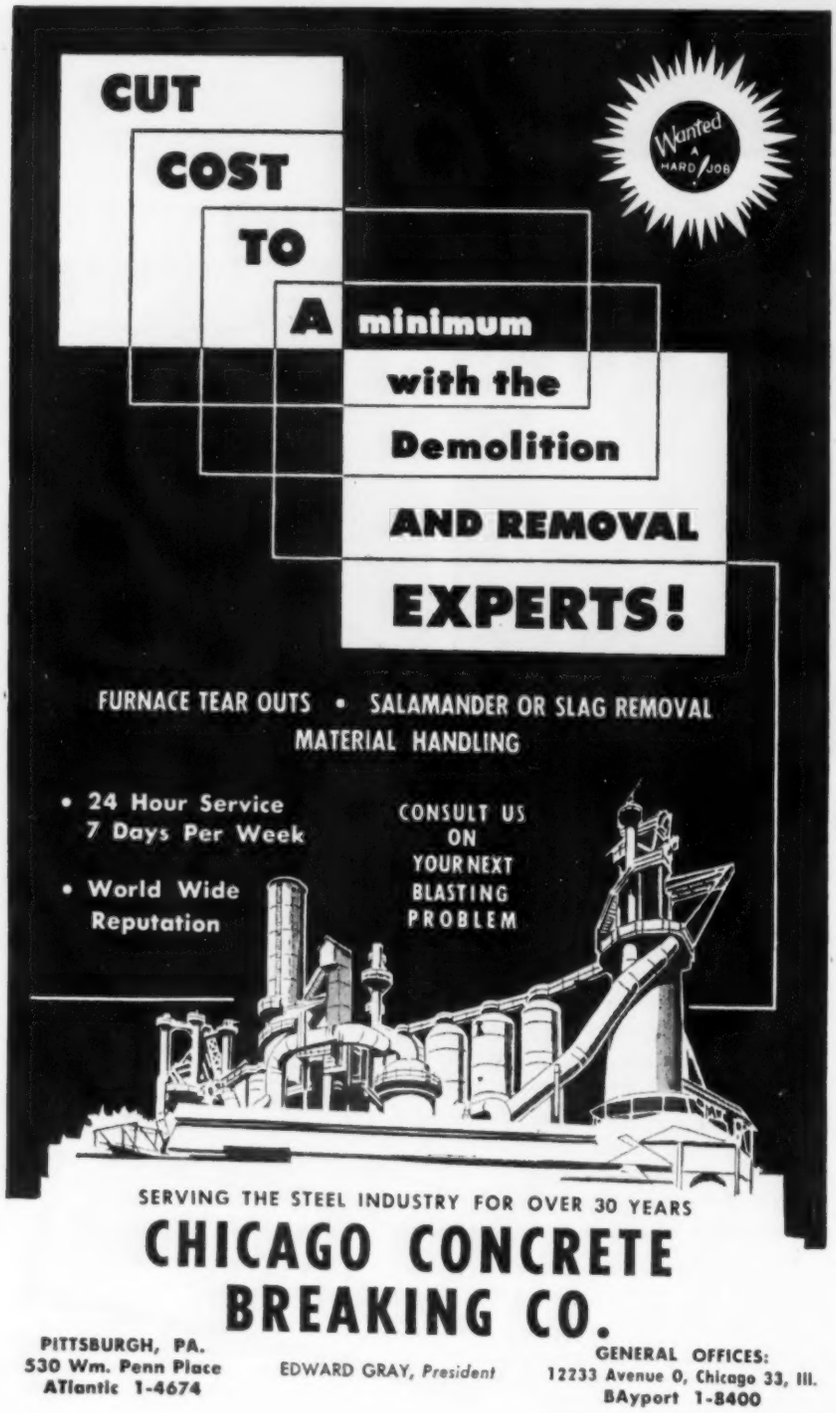
## SHEETMETAL STITCHER:

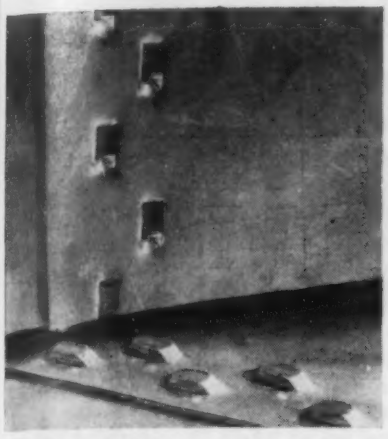
**Punch and die stitch sheetmetal together at high speed.**

An unusual one-step fastening method recently demonstrated in San Francisco may prove faster and cheaper for fastening and fabricating sheet metal. Called Metalacing, the method uses a patented punch and yieldable die. With these it buttons metal to metal—without use of rivets, bolts, welds or solder.

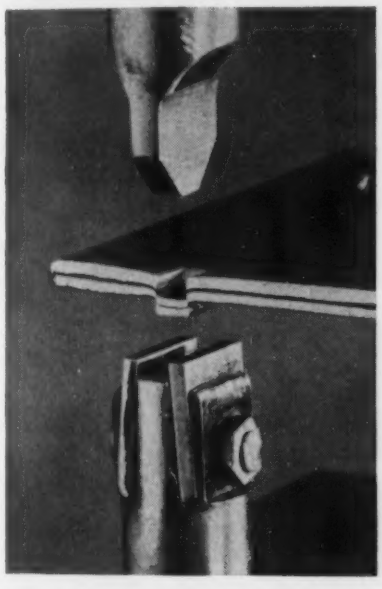
Any ordinary punch press equipped with the special punch and die which is used. Crockatt Engineering Co., San Francisco, has sole rights to license the new development.

Strength and holding qualities of the Metalace fastening are reported to compare favorably with conventional rivets. Punch action permits rapid one-step application of successive "button" fastenings.

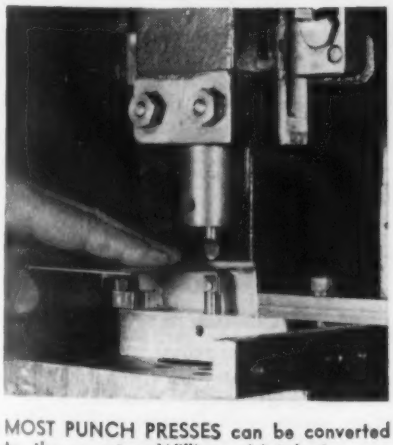





TOP AND BOTTOM views show how sheet-metal is stitched together without using fasteners. "Stitches" are 1/16 in. wide, 3/16 in. long. Material shown is galvanized sheet steel 1/32 in. thick.



CROSS-SECTION VIEW shows how punch and die slit metal and flatten out incised portion of metal.



MOST PUNCH PRESSES can be converted to the one-step Williams Metalacing operations by using special punch and die.

Multiple operations such as hole drilling, alignment inserting and riveting or screwing necessary with other methods are not used.

The method is reported to work with any material which can be sheared, drawn and upset. Success of the method stems from three operations that take place during the impact of the punch on the metal and die.

First, the punch creates a parallel double incision in the two sheets of metal being fastened. Metal between these incisions is pushed downward, against the anvil of the die beneath the sheets and between the die's yieldable jaws. Force of the impact spreads the depressed metal sideways.

*Turn Page*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## — Technical Briefs —

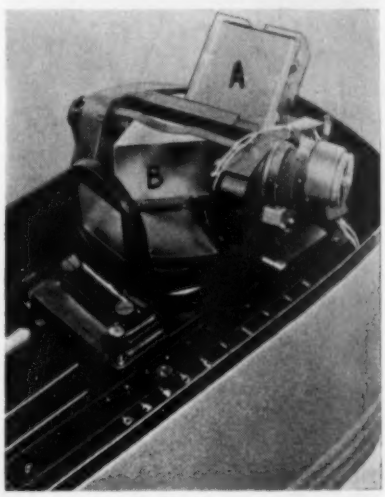
## SCIENCE:

**New type spectrograph makes industrial analyses more accurate.**

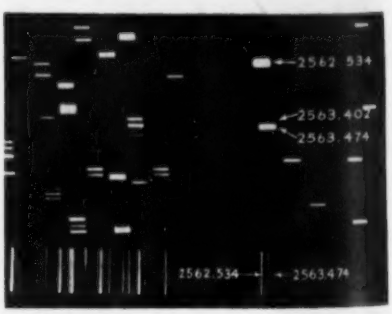
Research and industrial scientists have a new, more accurate spectrograph at their disposal. Embodying an unusual combination of a prism and an echelle, the unit makes possible fast, routine analyses in the proportion of one part in a million or less.

The instrument uses a new optical element known as an echelle, conceived 4 years ago by Dr. George R. Harrison, dean of science at Massachusetts Institute of Technology. The instrument was developed by Bausch & Lomb Optical Co., Rochester, N. Y.

Before the echelle was developed, spectrographs were made constantly larger to obtain maximum utilization of prisms and diffraction gratings. Space limitations blocked fur-




TWO-DIMENSIONAL SPECTRUM produced with aid of echelle A and prism B will help scientists explore the structure of the atom.




INCREASED DISPERSION is chief factor in the more accurate analysis possible with the new spectrograph. Here conventional prism spectrogram (bottom vertical lines) and echellogram are compared.

*Turn to Page 162*

## INITIAL PINCH TYPE PLATE BENDING ROLL

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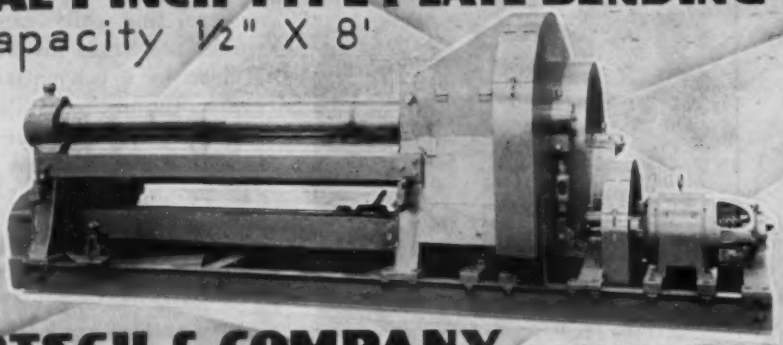

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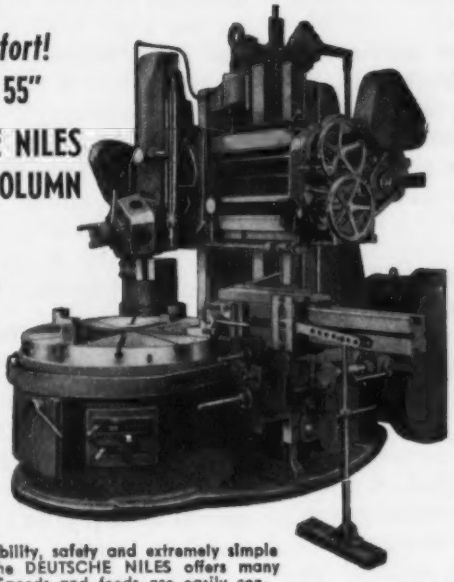

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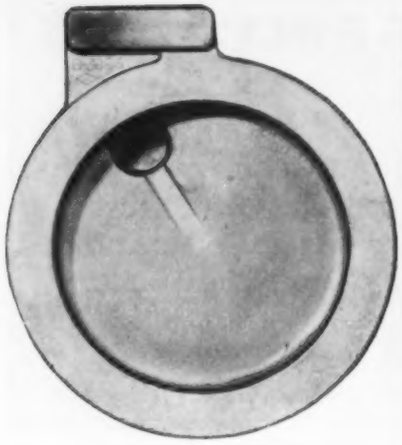

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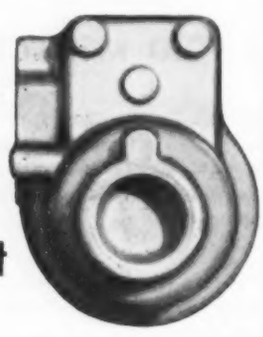

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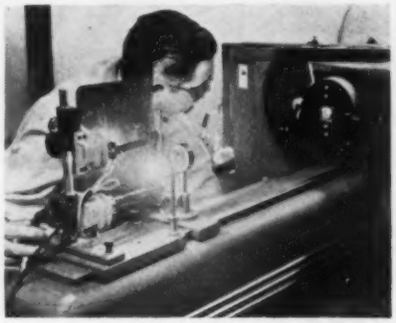

LIGHT from burning sample at left is directed into instrument. Spectrum, dispersed vertically and horizontally by echelle and prism, is then recorded on photographic plate.

ther progress. The echelle offers a new solution.

As used in the new instrument, an echelle is an inch-thick, optically flat glass plate, 3x5 in., in which grooves have been precisely ground, 200 to the inch. They are made by a laborious, highly-skilled hand process.

### Greater Resolving Power

Like a prism or diffraction grating, an echelle disperses light into a spectrum so that the composition of the light-emitting source can be studied in detail. The dispersive power of an echelle, however, can be 10 or more times that of a diffraction grating. Its resolving power, or ability to show the separation of spectral lines, is doubled or tripled.

These properties make it possible to design high dispersion spectrographs of smaller size. It would take a conventional instrument 72 ft. long to approximate the dispersive power of the 8-ft. Littrow-Echelle Spectrograph. The larger unit would lack the light-gathering power of the echelle spectrograph.

In the new instrument, the echelle is used in conjunction with a prism so that the prism spreads out the spectrum horizontally on the spectrographic plate and the echelle spreads it out vertically. This produces a two-dimensional spectrogram of greatly increased value in identifying and measuring the substances under study. This new form of spectrogram is called an "echellogram."

A typical quantitative application is the analysis for boron in steel, using the 2497.733 boron spectral line which cannot be distinguished from the 2497.820 line of iron by a conventional spectrograph. Using the new echelle spectrograph, however, these lines are readily studied because they appear 0.28 mm apart on the photographic plate.

## CYCLOTRON:

**New machine can fuse light particles to make heavier elements.**

Fusion of light elements to make heavier elements will be possible on a new 63-in. cyclotron. The machine, which will open a new field of fundamental research in nuclear physics has been developed for use at Oak Ridge National Laboratory by Union Carbide & Carbon Corp. and the Atomic Energy Commission.

In heavy-particle acceleration, nitrogen ions are accelerated to an energy of 25 million electron volts (Mev). With this energy it is possible to bring about the nuclear fusion of elements.

### Fission In Reverse

The nuclear-fusion reactions obtained are in some ways the reverse of nuclear fission. In the fission of a uranium atom, the large nucleus breaks into two smaller nuclei and several smaller particles (neutrons).

These fragments fly apart with great velocities, releasing a considerable amount of energy. In the case of fusion, energy is supplied to drive one nucleus into another and the two combine to form a larger nucleus, and several small particles (usually protons or alpha particles) are given off.


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# All Signs Point to Solid Boom for Next Six Months

**Firm demand, high capacity indicate record operations . . . Controls change a major industry victory . . . Automakers remain biggest user . . . Wage, price rises probable in spring.**

Steel business during the next 6 months looks like money in the bank. Demand is surprisingly firm; raw materials are adequate; expansion programs are coming along nicely; and chances for solving the seventh round wage question without a strike look good.

On top of this the industry has won a signal victory in its fight for clarification of control policy after June 30. This will be simply done by two orders: First will cancel all non-defense allocation authority as of June 30; second will establish "Defense Materials System" as a "little CMP" to guarantee materials for defense and atomic energy programs.

**Keeping Cool** . . . Steel producers are watching these developments with guarded enthusiasm. Some are starting to book third quarter business on the assumption that business will be "back to normal"—except for setasides on military and atomic energy business which are expected to amount to about 12 pct of total shipments.

A few producers want to know more about the new DMS before booking third quarter business. One important mill is opening its third quarter books in accordance with lead time (time between ordering and shipment) of various products. It is now taking orders for alloy steels, mechanical tubing and line pipe.

Order books are expected to fill in relation to intensity of demand for products: driving demand for such items as hot and cold-rolled sheets and large bars will likely fill them up first.

**What's "Essential"?** . . . Although some controls proponents are fighting a rear guard action to get requirements for so-called defense supporting or essential industries included in the program of setasides assuring military priority, they are given little chance to succeed. Under similar set-ups in the past a wide range of purely civilian industries have advanced compelling arguments to prove that they are defense supporting or essential.

Mills generally are assuming controls will be limited to military and atomic energy programs. They plan to accept orders up to the point where enough will be left to meet expected requirements for these rated end uses, using tonnages they had set aside under CMP as a guide. Belief is that DMS will establish military and atomic energy setasides on a straight tonnage rather than the percentage basis used in the past.

**Autos Take Most** . . . Tracing sources of overwhelming demand leads most often to the No. 1 steel consumer, the auto industry. There is no question that accelerating auto production schedules are pumping great strength into the steel market. Sheets and bars are hottest, but this industry has greatly tightened the supply of such items as chrome-stainless and spring wire which some had expected to ease.

Slight improvement in supply is permitting auto plants to meet rising schedules which were recently shaved in a few spots because of shortages. The Detroit market is compared to 1950 in intensity, although steel supply is expected to improve gradually instead of getting worse. If record sales rates of independents indicate an auto buying boom, as many Detroiters say it does, steel will stay tight until new model introductions bring schedule reprieves.

**Farmers Take More** . . . Farm demand, least robust section of the steel market, has taken a turn for the better. Buying of fence and other merchant wire products, which had been down, is picking up. Better pounding weather has raised nail demand at the jobber level. Expecting a slump, some wire people had over-estimated products they'd have available and have been doing some scrambling to meet delivery promises.

Conversion, held high by the auto boom, is again being sought by appliance makers. It will carry into the third quarter. Some contracts are being written with cancellation clause "hedges" calling for $25 to $35 per ton escape penalties. If consumers can get regular mill steel they can pay the cancellation penalty and still pocket a tidy saving. (Some conversion steel costs two or three times regular mill prices.)

**Price Rise Probable** . . . Outlook for continuing high level demand strengthens expectation of a selective steel price increase by summer—when the union bid for a seventh wage round has been dealt with. Steel leaders are determined that there shall be no wage increase this year without at least a fully covering price increase.

Steelmaking operations this week are scheduled at 100.5 pct of rated capacity, unchanged from the past 4 weeks.

(A) Roller for 1½" to 1¼" rounds
(B) Same type roller machined, after use, for 1⅜" to 1½" rounds
(C) Same type roller re-machined for 1⅜" to 2½" rounds
Note complete absence of fire checking at any time during the entire service life of this roller.
A
B
C

# CM Alloy Guide Rollers

## Outperform Tool Steel Rolls **BETTER THAN 10 TO 1**

In one of the largest continuous rod and bar mills in the country, Coast Metals guide rollers are establishing a performance record of 75,000 tons per roll. This is how it is done. After being used on the smaller size rounds, until worn beyond efficient operation, they are machined to accommodate the next larger size. For example: A roller designed for 1½" to 1¼" rounds when worn, is re-machined to accommodate 1⅜" to 1⅛" rounds. When worn again, it is re-machined for 1⅜" to 2½" rounds.

In this way, a total of no less than 75,000 tons is actually *rolled on one roller* during its three periods of service—ten times the production obtainable from a tool steel roller in the same application.

Coast Metals products—in the form of long-life wear-resistant alloy parts and specialized weld rods for hard-facing—are enabling steel mills to increase the life of their equipment and reduce downtime. This is only one of many applications in which CM Alloys help to hold down manufacturing and maintenance costs.

Other CM high *heat* and *wear-resistant* parts made for the steel industry include: *Twister Rolls, Bushings* and *Sleeves, Side Guide Rollers* for continuous strip mills, *Guide Rollers* for pickling mills, *Leveller Rolls,* and *Trimmer Rolls, Friction Twist Guides, Flat Friction Guides, Rolls* for up-coilers and down-coilers, etc.

Let us show you how CM Alloys can meet your particular requirements—*put money in your pocket* by reducing your maintenance costs substantially.

**COAST METALS, Inc.**

*Little Ferry, N. J.*

**COAST METALS (CANADA), LTD., Hamilton, Ontario**

**PRODUCERS OF SPECIAL HARD-FACING ALLOYS FOR THE STEEL INDUSTRY**

# Market Briefs and Bulletins

**Mill Near Completion . . .** Though materials handling equipment has not been completed, Continental Steel Corp. has already run test bars through its new 1000-ton per day rod mill at Kokomo, Ind. The mill, with facilities for producing wire and rod in sizes from 5 gage to 1 in., will be completed during the second quarter.

**Tinplate Holds . . .** U. S. Steel Corp. has told its customers that current prices of tin mill products will remain in effect until Sept. 30.

**Need $20 Billion More for Defense . . .** Massachusetts Institute of Technology has recommended that an additional $20 billion be spent to defend the U. S.

**Better Than Expected . . .** Estimates of normal demand for capital goods based on projection of trend lines for expenditures of past years may no longer be valid, reports Machinery & Allied Products Institute. In *Capital Goods Review*, the Institute shows that trend predictions based on expenditures between 1900 and 1930 are 15 to 30 pct below actual expenditures. While recognizing the influence of pentup postwar demand, the Institute believes advancements in technology may be an important factor in pushing demand for capital goods above its historic 3 pct per year growth rate.

**New Way to Nickel-Plate . . .** A new chemical method of plating nickel has been developed by General American Transportation Corp., Chicago. Named Kanigen, the process makes it possible to put a predictable thickness of plating on many materials, including steel, copper, brass, bronze, stainless steel, aluminum, glass, ceramics, magnesium and plastics. In addition, the production-line plating process is reported to use less nickel. General American plans to build two plants to utilize the method. Both will be in operation by the third quarter. Other companies will be licensed later on.

**Work on Locomotive Turbine . . .** Development of a coal-burning gas turbine has advanced far enough so that intensive work will be started on possible commercial applications, particularly for locomotives. American Locomotive is currently engaged in developing a commercial turbine and in designing a locomotive chassis under a recent agreement with Bituminous Coal Research, Inc.

**Tubes Cost More . . .** Babcock & Wilcox Co. has raised prices on some tubular products effective with shipments after Feb. 27. Seamless and welded tubes, AISI Type 300 are up 3 pct; seamless and welded stainless tubes, AISI Type 400, and seamless tubes, AISI Type 500, have both been upped 2 pct.

**Open New Steel Plant . . .** Bliss & Laughlin's new Detroit steel plant is scheduled to be in production around May 1. Price for cold-finished carbon steel bars f.o.b. Detroit will be $5.125 per 100 lb; cold-finished alloy steel bars will be priced at $6.20 per 100 lb.

**Raise Prices . . .** Diamond Alkali Co. has increased prices on soda ash and chlorine, effective Apr. 1. Carload soda ash is slated for a 15¢ per 100 lb rise in both bulk and packages. Chlorine will go up 20¢ per 100 lb in single unit tank car deliveries. For multi-unit tank car deliveries of chlorine, the increase ranges from $3.80 per 100 lb, for 75 tons and more, to $8 per 100 lb for 8 ton shipments. Due to possible continuance of price controls the new prices will apply only to shipments made on or after May 1.

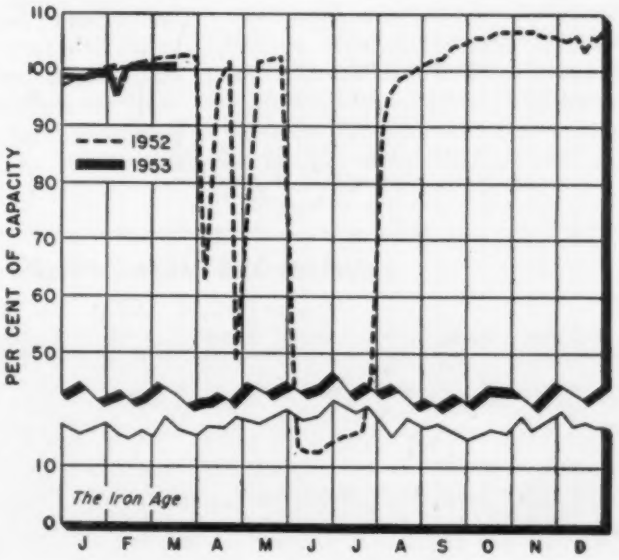
**Britain Hikes Iron, Steel . . .** British iron and steel prices have been raised between 1 and 1½ pct, effective Mar. 14, to cover the recent increase in coal prices. Foundry pig iron is up $1.40 per long ton, while plates cost $1.75 more.

## STEEL OPERATIONS

**District Operating Rates**

| District | Week of March 15 | Week of March 8 |
|---|---|---|
| Pittsburgh | 107.0 | 107.0 |
| Chicago | 103.0 | 104.5* |
| Philadelphia | 97.0 | 96.0 |
| Valley | 102.0 | 102.0 |
| West | 109.0 | 103.0* |
| Cleveland | 94.5 | 93.5* |
| Buffalo | 94.0 | 94.0 |
| Detroit | 105.0 | 107.0* |
| Birmingham (South) | 98.5 | 98.0 |
| Wheeling | 101.0 | 101.0 |
| South Ohio River | 89.5 | 92.5 |
| St. Louis | 88.0 | 87.0 |
| East | 93.0 | 92.0* |
| **Aggregate** | **100.5** | **100.5** |

Beginning Jan. 1, 1953, operations are based on annual capacity of 117,522,470 net tons.
* Revised



# No Shift In Aluminum Stockpiling

**Munitions Board wanted flying start . . . Plans already set call for heavier stockpiling than at any time since Korea . . . Civilians will still get more metal—By *R. L. Hatschek.***

Result of last week's aluminum stockpiling meeting in Washington was that there will be no change in plans. The program originally called for stockpiling of the light metal during the second, third and fourth quarters in healthy quantities.

But the Munitions Board, feeling that the market was getting pretty free, wanted an extra slug of aluminum put in the stockpile during the second quarter to help make up for the lack of stockpiling during the past year and a half.

**More Than Ever** . . . Original plan, to which the producers had agreed and which will be carried out, calls for substantial tonnages to be put away—more than at any time since the beginning of the Korean fracas.

But because of production hikes this should not interfere with civilian use of the metal.

**Would Slow Decontrol** . . . What the industry feared in the Munitions Board proposal was that extra stockpiling would have slowed the decontrol timetable. Continued capacity production, such as the January total of 89,895 tons compared to 83,409 tons in December, will permit simultaneous stockpiling and the shift from Controlled Materials Plan to Defense Materials System.

Under DMS, which will go into effect in the second half, 30 pct of the aluminum supply is the indicated set-aside for military purposes. This 30 pct corresponds to the peak use of aluminum for direct defense production during the Korean conflict.

**May Shift to Tons** . . . And 30 pct of today's high aluminum output would give the military more metal than they have used yet. There have been some indications that the percentage figures for steel, copper and aluminum may give way to actual tonnages needed by the services.

This would certainly be more realistic. It would permit more material to go into civilian production with rising output of the metals. And, in the event of curtailed production from strikes or drought or other unforeseeable causes, the military would be assured of the quantities needed.

**Copper Deliveries Dip** . . . Both production of refined copper and deliveries to fabricators were lower in February than in the previous month, according to Copper Institute statistics. The dips result primarily from the shorter month but stocks of Institute members rose both in the U. S. and elsewhere.

February refined production was 101,538 tons in the U. S. and 88,539 tons outside the U. S. Corresponding figures for January were 108,010 tons and 93,667 tons, respectively. Deliveries in the U. S. totaled 117,204 tons and outside the U. S. totaled 65,195. Total stock increase was 2702 tons of refined copper.

**Prices Still Akilter** . . . There has been no change of the multiple pricing setup in the copper industry. Mine producers' prices are still in a range of 27½¢ to 32¢ per lb with custom smelters up to 34¢ per lb.

Custom smelters last week again cut their scrap buying prices back to 28½¢ for No. 1 copper wire with regular differentials for lower quality material. They had been at 29¼¢, then cut back to 28½¢, then again at 29¼¢. Reports are that they are getting all they need or want.

**Canadian Prices Climb** . . . Reflecting the stiffening prices of copper and lead in the U. S., together with more favorable marketing prospects both in the U. S. and England, Canadian prices have been given an upward shove.

Copper moved up from 29½¢ to 33¢ per lb and lead rose ½¢ to 13¼¢ per lb. Zinc is meekly holding at 11¢.

**Inco Boosts Mill Items** . . . New prices were also posted last week for nickel, Monel and Inconel mill products by International Nickel Co. Increase for "A" nickel items was 7¢ per lb across the board; for Monel, 4½¢; and for Inconel, a straight 6½¢ boost.

**GSA Buys Zinc** . . . General Services Administration has taken all zinc offered by the trade for stockpiling. Whether this will have any effect on the market depends on the quantity purchased, reportedly at the going price, but this is classified information.

**NONFERROUS METAL PRICES**

| | Mar. 11 | Mar. 12 | Mar. 13 | Mar. 14 | Mar. 16 | Mar. 17 |
|---|---|---|---|---|---|---|
| Copper, electro, Conn.... | 27.50-34.00 | 27.50-34.00 | 27.50-34.00 | 27.50-34.00 | 27.50-34.00 | 27.50-34.00 |
| Copper, Lake, delivered .. | 32.125 | 32.125 | 32.125 | 32.125 | 32.125 | 32.125 |
| Tin, Straits, New York.... | $1.21½ | $1.21½ | $1.21½ | .... | $1.21½ | $1.21½* |
| Zinc, East St. Louis ..... | 11.00 | 11.00 | 11.00 | 11.00 | 11.00 | 11.00 |
| Lead, St. Louis ..... | 13.30 | 13.30 | 13.30 | 13.30 | 13.30 | 13.30 |

Note: Quotations are going prices.
*Tentative.

# *Since 1850*

## WE HAVE PRODUCED ENOUGH IRON ORE TO MAKE THE STEEL TO BUILD A CITY THE SIZE OF NEW YORK:—

. . . During our first century we have furnished the steel makers of America with considerably more than two hundred million tons of high grade iron ores. The many years in which we have produced and shipped these ores have given us a reputation of reliability and integrity.

In the second century we will not rest on our laurels, but will continually strive to improve the quality of our ores, coals and lake transportation.

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*The Cleveland-Cliffs Iron Company*

UNION COMMERCE BUILDING • CLEVELAND 14, OHIO

# Mill Warns No. 2 Grade Prices to Drop

**Welcome mat's out for premium grades but secondary grades weaken in some centers . . . Pittsburgh reports consumer plans to pay less for No. 2 heavy melting and No. 2 bundles.**

With the scrap stockpiles of many steel mills loaded high with secondary grades of scrap, the welcome mat for premium grades is being kept immaculate. Not so for turnings and No. 2 heavy melting and bundles which have eased downward in some areas and point to a trend.

It seemed in some centers that if a mill wasn't warning lower prices for No. 2 grades were imminent it was restricting shipments. In Pittsburgh a major mill told brokers it intended cutting down its offering prices for No. 2 steel and bundles. Mills had previously complained of the poor quality of the bundles. One Eastern mill which this week was holding back shipments of No. 2 material told THE IRON AGE it had been willing to pay old ceiling prices for No. 2 bundles but had been forced to downgrade many shipments.

In other areas the flow of scrap, especially in secondary grades, was turning sluggish. Chicago traders felt weakness in turnings and some expected a further drop. Turnings in Cleveland skidded.

In response to a few queries, IRON AGE prices are now being quoted on either a delivered or brokers' buying price basis, depending on the area. This necessitated a conversion from the old Office of Price Stabilization basing point method.

**Pittsburgh**—Consumer thinking on secondary grades of scrap continues bearish. A leading mill has advised brokers it plans to offer lower prices for No. 2 steel and No. 2 bundles on orders to be placed late this month. A $42 delivered price would be paid for No. 2 steel and $40 delivered for No. 2 bundles, both off $2. This unusual advance warning is expected to accelerate movement of these grades on current orders. Blast furnace and cast iron grades continued to be weak.

**Chicago** — Scrap movement was generally at a slow pace. Turnings were moving very poorly at the dealer level with buying cautious, indicative that a further drop was expected. An attempt was made to buy at $25. Railroad grades continued to show strength, and there was considerable feeling that No. 1 steelmaking grades might show another slight jump.

**Philadelphia**—Scrap market in this district seems to have settled down to a more stable condition. Not much trading has been done in steel grades except for No. 2 bundles at $40 and $41. New business expected this week may bring this down $1. Big cast buyers are reported out of the market until April. Cast grades are soft.

**New York**—Although demand for prime grades of steelmaking scrap remained potent, shipments of secondary steelmaking grades and turnings eased off this week. No. 2 bundles are quoted at $34 a ton while turnings softened a little. One mill was holding back shipments of No. 2 grades. Cast consumers were even more lackadaisical.

**Detroit**—The trade here is seething over what should constitute the price of No. 1 bundles. Bulk of industrial scrap is being directed to openhearths at several dollars less than the price at electrics. Electric market, however, represents more the free market price level although not the bulk of tonnage. Weaknesses are starting to show in No. 2 grades with No. 1 steel moving at old ceiling levels.

**Cleveland**—Weakness in turnings market became more pronounced this week as mixed borings and machine shop turnings dropped $1 to $31. Short turnings and cast iron borings went down $2 to $34 to accent the trend. Foundry buyers' resistance to high-priced rail specialties was high. Prices in the Youngstown area remained steady. Low phos jumped $1 to $50.

**Birmingham** — Overall, the scrap market was dull this week, with dealers principally engaged in moving orders received last week. Brokers say prices are steady but show signs of softening. The largest buyer of steel scrap was out of the market after placing orders last week and setting at least a temporary price pattern.

**St. Louis**—Rails and other railroad specialties have risen sharply above ceiling prices because of short supply, heavy demand and sharp competition among brokers. Movement of heavy melting steel and bundled sheets has stepped up, causing one large mill to establish an embargo on further shipments. But prices are unchanged. Borings and turnings are down.

**Cincinnati**—Scrap prices in this area have settled down after last week's brief splurge in the rail market. No. 2 bundles still held at ceiling with no change expected at least until April buying gets under way. Cast scrap, which has been wobbly for months, dropped $2 to $50. Most buying here is being done on the OPS level but mills hope to switch to a delivered basis in April.

**Buffalo**—Dealers report a definite shortage of yard scrap but the possibility of stronger prices at this time is offset by mills' huge reserve stocks. Use of hot iron is also running high. An estimated 75 to 80 pct of current iron output is going into steel.

**Boston**—While there have been a few sales of No. 1 steel at $36.17, major portion of the market is at $33.17 to $34.17. No. 2 bundles are off $2. Feeling here is that steel grades are a bit weaker and prices may slip further. Cast, which has been weak, is even weaker with prices quoted $1 to $2 lower this week.

**West Coast**—Seattle steelmaking scrap slipped to the level of San Francisco and Los Angeles last week. No. 1 heavy melting and No. 1 bundles dropped $4 and No. 2 heavy melting and No. 2 bundles $3. Cupola and mixed yard cast were not selling at any price.

ACCO products

CHECK

☐ **Shaped Wire***

— Flat
● Round
◙ Odd contour

Low or high carbon, stainless, special alloy, Armco. You draw the shape—PAGE can draw the wire.

☐ **Armature Banding Wire**

Tinned stainless or carbon steel. In reels of 50 to 200 pounds. Stainless has high tensile strength, high resistance, low permeability.

☐ **Lock Safety Wire**

Tough, durable, workable. In the size and type for your work.

☐ **Spring Wire**

Any shape* . . . high carbon . . . hard drawn . . . high tensile . . . stainless . . . galvanized . . . tinned . . . bright.

*Cross-sectional areas up to .250" square; widths to ⅜"; width-to-thickness ratio not exceeding 6 to 1.

**YOU do this—**
Give us the specifications of the wire you need—or tell us details of job to be done.

**WE'LL do this—**
Send you recommendations, prices and delivery date. Samples on request. PAGE offers you a wide variety of wires to choose from.

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AMERICAN CHAIN & CABLE

Monessen, Pa., Atlanta, Chicago, Denver, Detroit, Los Angeles, New York, Philadelphia, Portland, San Francisco, Bridgeport, Conn.

## —Ferroalloy Prices—

*(Effective Mar. 17, 1953)*

**Alsifer, 20%** Al, 40% Si, 40% Fe, contract basis, f.o.b. Suspension Bridge, N. Y.
Carloads ..... 9.50
Ton lots ..... 11.30

**Calcium molybdate,** 46.3-46.6% f.o.b. Langeloth, Pa., per pound contained Mo ..... $1.15

**Ferrocolumbium,** 50-60% 2 in. x D contract basis, delivered per pound contained Cb.
Ton lots ..... $4.90
Less ton lots ..... 4.95

**Ferro-Tantalum-Columbium,** 20% Ta, 40% Cb, 0.30 C. Contract basis, delivered, ton lots, 2 in. x D, per lb of contained Cb plus Ta ..... $3.75

**Ferromolybdenum,** 55-75%, f.o.b. Langeloth, Pa., per pound contained Mo. ..... $1.32

**Ferrophosphorus,** electrolytic, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $3 unitage, per gross ton ..... $85.00
10 tons to less carload ..... $75.00

**Ferrotitanium,** 40% regular grade, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti..... $1.35

**Ferrotitanium,** 25%, low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti ..... $1.50
Less ton lots ..... 1.55

**Ferrotitanium,** 15 to 18%, high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload per net ton ..... $177.00

**Ferrotungsten,** ¼ x down, packed, per pound contained W, ton lots, f.o.b. ..... $4.95

**Molybdic oxide,** briquets or cans, per lb contained Mo, f.o.b. Langeloth, Pa. ..... $1.14
bags, f.o.b. Washington, Pa., Langeloth, Pa. ..... $1.13

**Simanal,** 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound
Carload, bulk lump ..... 14.50¢
Ton lots, bulk lump ..... 15.75¢
Less ton lots, lump ..... 16.25¢

**Vanadium Pentoxide,** 86 - 89% $V_2O_5$ contract basis, per pound contained $V_2O_5$ ..... $1.38

**Zirconium,** 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy.
Ton lots ..... 21.00¢

**Zirconium,** 12-15%, contract basis, lump, delivered, per lb of alloy.
Carload, bulk ..... 7.00¢

**Boron Agents**

**Borosil,** contract prices per lb of alloy del. f.o.b. Philo, Ohio, freight allowed, B, 3-4%, Si, 40-45%, per lb contained B.... $5.25

**Bortam,** f.o.b. Niagara Falls
Ton lots, per pound ..... 45¢
Less ton lots, per pound.... 50¢

**Corbortam,** Ti, 15-21%, B, 1-2%, Si, 2-4%, Al, 1-2%, C, 4.5-7.5%, f.o.b. Suspension Bridge, N. Y., freight allowed.
Ton lots, per pound ..... 10.00¢

**Ferroboron,** 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D. Ton lots.... $1.20
F.o.b. Wash., Pa.; 100 lb up
10 to 14% B ..... .85
14 to 10% B ..... 1.20
19% min. B ..... 1.50

**Grainal,** f.o.b. Bridgeville, Pa., freight allowed, 100 lb and over.
No. 1 ..... $1.00
No. 6 ..... 68¢
No. 79 ..... 50¢

**Manganese - Boron,** 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd
Ton lots ..... $1.46
Less ton lots ..... 1.57

**Nickel - Boron,** 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, delivered
Less ton lots ..... $1.30

**Silcaz,** contract basis, delivered.
Ton lots ..... 45.00¢


# Manual Lincolnweld cuts welding time 50%

FASTER welding speeds now possible with "Manual Lincolnweld" can lower welding costs substantially on a wide variety of work. On these truck bodies, for example, higher welding speeds cut welding time in half. Welds are of higher quality. Less time is needed for weld cleaning.

To simplify operations, the work is held in a positioner permitting most welds to be made in downhand position at currents of 400 amps. The material is mostly ½" plate and 5/16" channel.

The high current density of "Manual Lincolnweld" (up to 600 amps on a 5/64" wire) is 3 to 4 times higher than that used on any arc welding process today. This results in deeper penetration, permits 100% butt welds in ¼" plate in one pass from each side without need for joint preparation, saving manhours and lowering shop costs.

**Fig. 1. Truck body** *in fabrication on positioner permits operator to make welds on bottom of truck as well as on inside.*

**Fig. 2. Manual Lincolnwelding** *bottom sections to end at 400 amps. Continuous electrode is fed through welding gun which also supplies granular flux to hide arc rays. Photos courtesy Easton Car and Construction Company, Easton, Pa.*

**GET THE FACTS**—Latest procedures for cutting costs with "Manual Lincolnweld" are in Bulletin 1303. Write on your letterhead to Dept. 1502.

**THE LINCOLN ELECTRIC COMPANY**
Cleveland 17, Ohio

THE WORLD'S LARGEST MANUFACTURER OF ARC WELDING EQUIPMENT

## CONSIDER GOOD USED EQUIPMENT FIRST

**BALER**

Logemann Model 7-PH Baler, Complete with Pump & Motor. Chamber 60"x16½"x18", Finished Bundles 16½"x6", averaging 60 to 90#.

**BRAKE—LEAF TYPE**

16' x ¾" Dreis & Krump Size No. 269 Leaf Type Bending Brake. Complete with 40 HP GE 220/440/3/60 1465 RPM.

**CRANE—GANTRY**

5 Ton Whiting Gantry Crane 52' Span. Double Column Fabricated Steel Legs Three Motors 220/3/60. 27" Lift Cab Control.

**FORGING MACHINE**

5" Forging Machine — Heavy Duty Steel Frame Suspended Header and Gripper Slides 30 HP. GE 220/3/60 Motor & Starter Factory Rebuilt with Standard Air Clutch.

**FURNACE—MELTING**

20 ton MOORE Size "NT" Melting Furnace—NEW With 7500 G.E. Transformer 13,200 Volt, 3 phase, 60 cycle

**PLATE DUPLICATOR**

150 ton Thomas Machine Co. Plate Duplicator Table Area 6' x 20' plates

**PUNCH & SHEAR COMBINATION**

No. 4½ UD Buffalo Universal Ironworker, Motor Driven with built-in Notcher NEW 1946 Capacities: Punch 1 9/16" thru 1¼". Shear, Rounds 3", Squares 2⅝". Angles 6x6x⅞", etc.

**ROLLING MILLS**

7½" Four High Steckel Rolling Mill, Work Rolls 2½" x 7½", Max. Steel Width 8". Complete Elecl. Equip.

12½" x 14" Philadelphia Two High Cold Rolling Mill. Complete with Pinion Stand, 75 H.P. Motor 440/3/60. Starter and Controls, Incl. Coiler.

18" x 24" Waterbury Farrel Two Stand Two High Rolling Mill. Complete with Elec. Equip.

18" x 60" Three High Roughing Mill, Complete with billet heating furnace and accessory equipment including electrical equipment.

21" x 76" Philadelphia Single Stand Two High Complete with Electrical Equipment

24" x 56" United Two High Roughing Mill

**STRAIGHTENERS**

No. 3 Medart Three Roll Rotary Straightener Capacity 1" to 3½" low carbon solid steel bars or up to 4½" OD pipe or tubing Extra Set of Rolls and Yokes Included. Timken Bearings—New 1950.

#1B Sutton Round Straightening Machine Capacity 3/16" to ¾" OD Tubing Top Rolls Friction Driven Motor Driven including Electrical Equipment. New 1947.

**TESTING MACHINE**

300,000 lb SOUTHWARK - EMERY Universal Hydraulic Testing Machine. Three 16" Dial Gauges
Ranges 0-300,000 lb
0-150,000 lb
0- 50,000 lb
Factory Rebuilt and Calibrated.

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# The Clearing House

NEWS OF USED AND REBUILT MACHINERY

**Hope Ammo Will Help . . .** As in other areas, used machine tool sales in California have fallen off in the last few months. But the trade is hoping for an improvement as the Army Ordnance ammunition program starts taking longer strides (THE IRON AGE, Mar. 12, p. 73).

Although the ratio of defense output to commercial production is highest in the West, primarily because of the coast's aircraft industry, used machine tool men believe there may be even more defense activity in the area soon.

They are hoping that the greater availability of western plants and the decentralization of defense production from the East and Middle West will mean an increase in the number of defense contracts for California manufacturers.

**Aircraft Slips . . .** Slowing of aircraft work has cut sales of used machinery around Los Angeles, but business in that area is still better than in the San Francisco Bay sector.

For California used machinery dealers, the best market is still the manufacturer who is putting his own money into defense work and who knows he can do a good job with used and rebuilt production equipment.

**Dealers Are Pessimistic . . .** Pittsburgh dealers are almost unanimous in reporting that business activity is slow. Few are willing to predict that the market will improve later in the year.

Although the slump covers all phases of the used and rebuilt machinery business, the market for steel mill equipment is particularly poor. Prospects either have difficulty raising money or prefer to wait in hope of working out a better price arrangement. It also appears the word has been passed to keep inventories down.

**Demand Higher Price . . .** Aggravating the situation is the price-consciousness of machinery owners who are pegging their prices on the belief that they should realize enough on a sale to counteract the higher cost of new machinery.

Electric equipment, slumping for several months, shows no sign of improvement. One big outlet, the coal industry, has been hurt by the mild winter weather with the result that coal companies are not buying as much equipment as they usually do.

**Leave Out Old Tools . . .** National Production Authority's report on the recent meeting of the Used Machine Tool Dealers Industry Advisory Committee and NPA officials states that some members were in favor of excluding tools manufactured before 1935 from the inventory reporting provisions of M-101 (Form NPAF-175).

Spokesmen for this proposal said it would cut their paperwork 50 pct. But, according to the NPA report, the committee decided that it would be more helpful to both dealers and the government if this age distinction were not made in its proposal.

As a result it was recommended that use of Form NPAF-175 in its present form be continued at least until June 30.

**Get Many Inquiries . . .** NPA officials report they receive an average of 500 inquiries a month on the availability of used tools. No estimate was made on the number of sales that have resulted from these inquiries.

The agency also states that, since NPA was established, it has been instrumental in locating between 8000 and 10,000 used tools for military and defense-supporting contractors who were unable to get new machinery.